



# HEIDENHAIN



## QUADRA-CHEK 3000 Demo

User's Manual

Evaluation Unit

English (en)  
02/2020

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# 1

## Fundamentals

## 1.1 Overview

This chapter contains information about the product and this manual.

## 1.2 Information on the product

### 1.2.1 Demo software for demonstration of the device functions

QUADRA-CHEK 3000 Demo is a software application you can install on a computer independently of the device. QUADRA-CHEK 3000 Demo helps you to become familiar with, try out or present the functions of the device.

### 1.2.2 Demo software features

Because of the missing hardware environment the range of features of the demo software does not correspond to the complete functional range of the device.

With QUADRA-CHEK 3000 Demo you can try out or present the following features:

- "Conducting a measurement"
- "Measuring with a VED sensor"
- "Displaying and editing the measurement results"
- "Creating a measurement report"

The following features cannot be tried out or presented with QUADRA-CHEK 3000 Demo:

- Connecting measuring devices
- Measuring with an OED sensor
- Measuring with a touch probe
- Connecting a network drive
- Connecting a USB mass storage device
- Connecting a printer

## 1.3 Intended use

The products of the QUADRA-CHEK 3000 series are advanced digital evaluation electronics for the measurement of 2-D and 3-D features in metrology applications. The products are used primarily on measuring machines, video measuring machines, coordinate measuring machines as well as profile projectors.

QUADRA-CHEK 3000 Demo is a software product for demonstration of the basic features of the QUADRA-CHEK 3000 series products. QUADRA-CHEK 3000 Demo may be used only for presentation, training or testing purposes.

## 1.4 Improper use

QUADRA-CHEK 3000 Demo is not intended for any use other than the intended use. Any use for other purposes is prohibited, specifically:

- For productive purposes in production systems
- As part of production systems

## 1.5 Notes on reading the documentation

### Have you found any errors or would you like to suggest changes?

We continuously strive to improve our documentation for you. Please help us by sending your suggestions to the following e-mail address:

[userdoc@heidenhain.de](mailto:userdoc@heidenhain.de)

## 1.6 Symbols and fonts used for marking text

In these instructions the following symbols and fonts are used for marking text:

Depiction	Meaning
▶ ...	Identifies an action and the result of this action
> ...	Example: <ul style="list-style-type: none"> <li>▶ Tap <b>OK</b></li> <li>&gt; The message is closed</li> </ul>
■ ...	Identifies an item of a list
■ ...	Example: <ul style="list-style-type: none"> <li>■ TTL interface</li> <li>■ EnDat interface</li> <li>■ ...</li> </ul>
<b>Bold</b>	Identifies menus, displays and buttons <ul style="list-style-type: none"> <li>▶ Tap <b>Shut down</b></li> <li>&gt; The operating system shuts down</li> <li>▶ Turn the power switch off</li> </ul>



# 2

**Software  
installation**

## 2.1 Overview

This chapter provides all of the information needed for downloading and properly installing QUADRA-CHEK 3000 Demo on a computer.

## 2.2 Downloading the installation file

Before you can install the demo software on a computer, you need to download an installation file from the HEIDENHAIN Portal.



To download the installation file from the HEIDENHAIN Portal, you need access rights to the **Software** portal folder in the directory of the appropriate product.

If you do not have access rights to the Portal's **Software** folder, you can request the access rights from your HEIDENHAIN contact person.

- ▶ Download the latest version of QUADRA-CHEK 3000 Demo here:  
**www.heidenhain.de**
- ▶ Select the download folder of your browser
- ▶ Unpack the downloaded file with the extension **.zip** into a temporary storage folder
- > The following files will be unpacked into the temporary storage folder:
  - Installation file with the extension **.exe**
  - File **DemoBackup.mcc**

## 2.3 System requirements

If you want to install QUADRA-CHEK 3000 Demo on a computer, the computer system must meet the following requirements:

- Microsoft Windows 7 or higher
- Screen resolution of at least 1280 × 800 recommended

## 2.4 Installing QUADRA-CHEK 3000 Demo in Microsoft Windows

- ▶ Select the temporary storage folder into which you unpacked the downloaded file with the **.zip** extension  
**Further information:** "Downloading the installation file", Page 14
- ▶ Run the installation file with the extension **.exe**
- ▶ The installation wizard is opened:

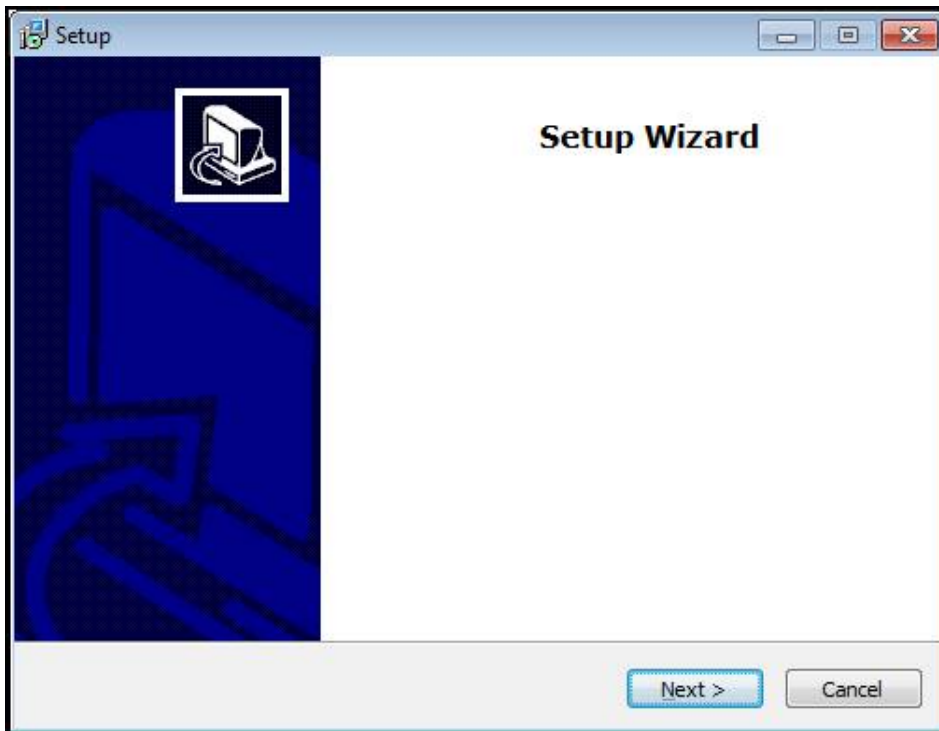


Figure 1: **Installation wizard**

- ▶ Click **Next**
- ▶ In the **License Agreement** installation step, accept the terms of the license
- ▶ Click **Next**

**i** In the **Select Destination Location** installation step, the installation wizard suggests a storage location. We recommend retaining the suggested storage location.

- ▶ In the **Select Destination Location** installation step, select the storage location to which you want to save QUADRA-CHEK 3000 Demo
- ▶ Click **Next**

**i** In the **Select Components** installation step, the ScreenshotClient program is also installed by default. ScreenshotClient enables you to take screenshots of the active screen.

If you want to install ScreenshotClient

- ▶ In the **Select Components** installation step, leave the default settings unchanged

**Further information:** "ScreenshotClient", Page 113

- ▶ In the **Select Components** installation step:
  - Select the type of installation
  - Activate or deactivate the option **Screenshot Utility**

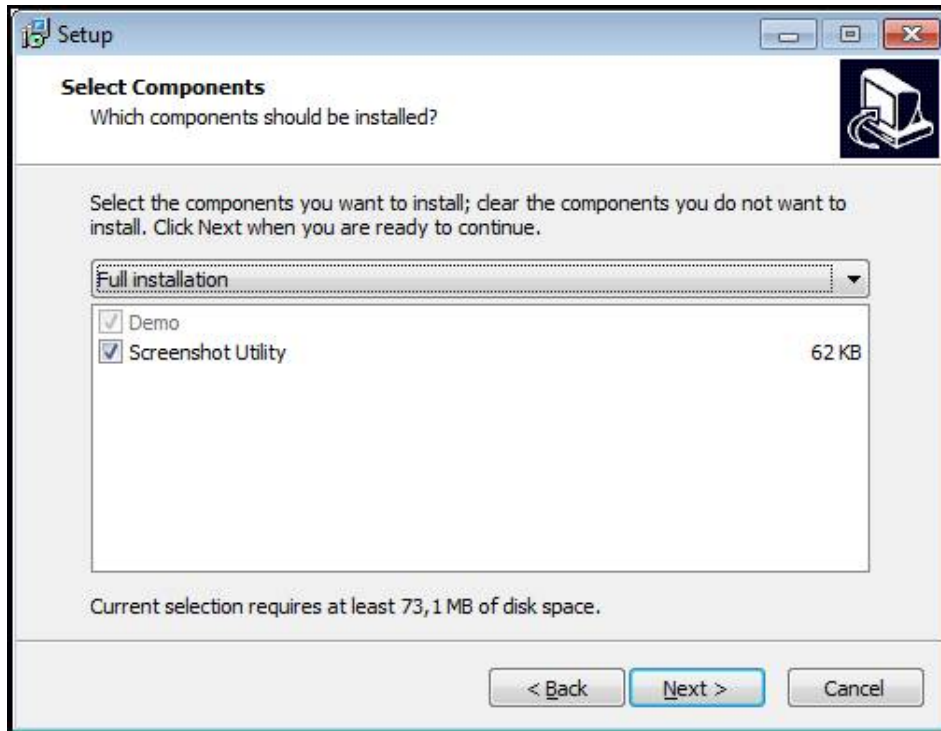


Figure 2: Installation wizard with activated options **Demo software** and **Screenshot Utility**

- ▶ Click **Next**
- ▶ In the **Select Start Menu Folder** installation step, select the storage location at which you want to create the start menu folder
- ▶ Click **Next**
- ▶ In the **Select Additional Tasks** installation step, select or deselect **Desktop icon**
- ▶ Click **Next**
- ▶ Click **Install**
- ▶ Installation starts—the status of installation is shown in the progress bar
- ▶ After installation has been completed successfully, use **Finish** to close the installation wizard
- ▶ The program has been successfully installed on your computer



## 2.5 Uninstalling QUADRA-CHEK 3000 Demo

- ▶ Select the following in succession in Microsoft Windows:
  - **Start**
  - **All programs**
  - **HEIDENHAIN**
  - **QUADRA-CHEK 3000 Demo**
- ▶ Click **Uninstall**
- > The uninstallation wizard opens
- ▶ To confirm uninstalling, click **Yes**
- > Uninstallation starts, and the progress bar indicates the status of the unistallation process
- ▶ After uninstallation has been completed successfully, close the uninstallation wizard with **OK**
- > The program has been successfully removed from your computer



# 3

**Basic operation**

## 3.1 Overview

This chapter describes the user interface, operating elements, and basic functions of QUADRA-CHEK 3000 Demo.

## 3.2 Using the touchscreen and input devices

### 3.2.1 Touchscreen and input devices

The operating elements on the user interface of QUADRA-CHEK 3000 Demo are operated via a touchscreen or a connected mouse.

To enter data, you can use the screen keyboard of the touchscreen or a connected keyboard.

### 3.2.2 Gestures and mouse actions

To activate, switch or move the operating elements of the user interface, you can use QUADRA-CHEK 3000 Demo's touchscreen or a mouse. Gestures are used to operate the touchscreen and the mouse.



The gestures for operating the touchscreen may differ from the gestures for operating the mouse.

If the gestures for operating the touchscreen differ from those for operating the mouse, then these instructions describe both operating options as alternative actions.

The alternative actions for operating the touchscreen or the mouse are identified by the following symbols:



Operation using the touchscreen



Operation using the mouse

The following overview describes the different gestures for operating the touchscreen or the mouse:

---

#### Tapping

---




Means touching the screen briefly with your fingertip



Means pressing the left mouse button once

### The actions initiated by tapping include

- 
  - Selection of menus, features or parameters
  - Entering characters with the screen keyboard
  - Closing dialogs
  - Displaying and hiding the main menu in the **Measure** menu
  - Displaying and hiding the Inspector in the **Measure** menu

---

### Holding (long press)




Means touching the screen and holding your finger(s) on it for a few seconds



Means pressing the left mouse button once and holding it down

### The actions initiated by holding are

- 
  - Quickly changing the values in input fields with plus and minus buttons

---

### Dragging



Is a combination of long press and then swipe, moving a finger over the touchscreen when at least the starting point of motion is defined



Means pressing the left mouse button once and holding it down while moving the mouse; at least the starting point of the motion is defined

### The actions initiated by dragging include



- Scrolling through lists and texts
- Positioning the measuring tools
- Opening the **Details** dialog in the Inspector

---

### Two-finger drag



Refers to the movement of two fingers across the touchscreen when at least the starting point of the movement is clearly defined



Refers to pressing the right mouse button once and holding it down while moving the mouse; at least the starting point of the movement is defined

### Two-finger dragging initiates the following action



- In the **Measure** menu, moving an image section within the field of view of a camera in the workspace  
**Further information:** "Moving an image section", Page 42
- In the **Measure** menu, moving the features view within the workspace

### 3.3 General operating elements and functions

The operating elements described below are available for configuration and operating the product via the touchscreen or input devices.

#### Screen keyboard

With the screen keyboard, you can enter text into the input fields of the user interface. Depending on the input field, a numeric or alphanumeric screen keyboard is shown.

- ▶ To enter values, tap an input field
- > The input field is highlighted
- > The screen keyboard is displayed
- ▶ Enter text or numbers
- > The correctness of the entry in the input field is shown with a green check mark
- > If the entry is incomplete or incorrect, a red exclamation mark is displayed. In this case, the entry cannot be completed
- ▶ To apply the values, confirm the entry with **RET**
- > The values are displayed
- > The screen keyboard disappears

#### Input fields with plus and minus buttons

To adjust a numerical value, use the + (plus) and - (minus) buttons to the left and right of the numerical value.



- ▶ Tap + or - until the desired value is displayed
- ▶ Long-press + or - to scroll through the values more quickly
- > The selected value is displayed

#### Toggle switch

Use the toggle switch to switch between functions.



- ▶ Tap the desired function
- > The active function is shown in green
- > The inactive function is shown in light gray

#### Slide switch

With the sliding switch, you can activate or deactivate a function.



- ▶ Drag the slider to the desired position
- or
- ▶ Tap the slider
- > The function is activated or deactivated

#### Slider

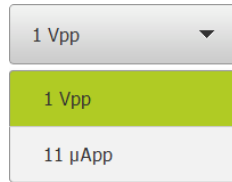
Use the slider (horizontal or vertical) to continuously adjust values.



- ▶ Drag the slider to the desired position
- > The selected value is displayed graphically or in percent

### Drop-down list

Buttons that open drop-down lists are indicated by a triangle pointing down.



- ▶ Tap the button
- > The drop-down list opens
- > The active entry is highlighted in green
- ▶ Tap the desired entry
- > The selected entry is applied

### Undo

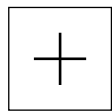
With this button, you can undo the last action.

Processes that have already been concluded cannot be undone.



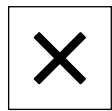
- ▶ Tap **Undo**
- > The last action is undone

### Add



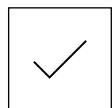
- ▶ To add a feature, tap **Add**
- > The new feature is added

### Close



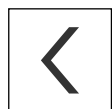
- ▶ Tap **Close** to close a dialog

### Confirm



- ▶ Tap **Confirm** to conclude an activity

### Back



- ▶ Tap **Back** to return to the higher level in the menu structure

## 3.4 QUADRA-CHEK 3000 Demo – startup and shut-down

### 3.4.1 Starting QUADRA-CHEK 3000 Demo



Before using QUADRA-CHEK 3000 Demo, you need to perform the steps for configuring the software.



- ▶ Tap **QUADRA-CHEK 3000 Demo** on the Microsoft Windows desktop

or

- ▶ Open the following in sequence in Microsoft Windows:
  - **Start**
  - **All programs**
  - **HEIDENHAIN**
  - **QUADRA-CHEK 3000 Demo**



Two executable files with different modes of appearance are available:

- **QUADRA-CHEK 3000 Demo**: starts within a Microsoft Windows window
- **QUADRA-CHEK 3000 Demo (full screen)**: starts in full-screen mode



- ▶ Tap **QUADRA-CHEK 3000 Demo** or **QUADRA-CHEK 3000 Demo (full screen)**
- > QUADRA-CHEK 3000 Demo starts an output window in the background. The output window is not relevant for operation and is closed again when the QUADRA-CHEK 3000 Demo is shut down
- > QUADRA-CHEK 3000 Demo starts the user interface with the **User login** menu

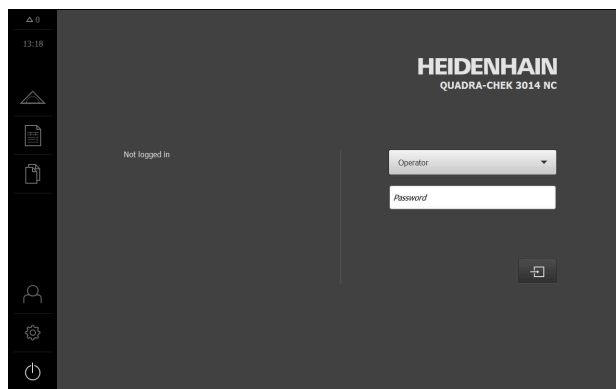


Figure 3: **User login** menu



### 3.4.2 Shutting down the QUADRA-CHEK 3000 Demo



- ▶ Tap **Switch off** in the main menu



- ▶ Tap **Shut down**
- > QUADRA-CHEK 3000 Demo is shut down



To shut down QUADRA-CHEK 3000 Demo in the Microsoft Windows window, also use the **Switch-off** menu.

If you use **Close** to close the Microsoft Windows window, all settings will be lost.

## 3.5 User login and logout

In the **User login** menu, you can log in and out of the product as a user.

Only one user can be logged in to the product at a time. The logged-in user is displayed. Before a new user can log in, the logged-in user has to log out.



The product provides various authorization levels that grant the user full or restricted access to management and operation functionality.

### 3.5.1 User login



- ▶ Tap **User login** in the main menu
- ▶ In the drop-down list, select the **OEM** user
- ▶ Tap the **Password** input field
- ▶ Enter the "oem" password of the **OEM** user
- ▶ Confirm entry with **RET**



- ▶ Tap **Log in**
- > The user is logged in and the **Measure** menu is displayed

The user login icon in the main menu shows whether the logged-in user has extended authorizations.

Icon	Authorization level
	Standard authorizations (user type <b>operator</b> )
	Extended authorizations (all other user types)

### 3.5.2 User logout



- ▶ Tap **User login** in the main menu



- ▶ Tap **Log out**
  - > The user is logged out
  - > All functions of the main menu are inactive, except for **Switch off**
  - > The product can only be used again after a user has logged in

## 3.6 Setting the language

The user interface language is English. You can change to another language, if desired.



- ▶ Tap **Settings** in the main menu



- ▶ Tap **User**
  - > The logged-in user is indicated by a check mark
  - ▶ Select the logged-in user
  - > The language selected for the user is indicated by a national flag in the **Language** drop-down list
  - ▶ Select the flag for the desired language from the **Language** drop-down list
  - > The user interface is displayed in the selected language

## 3.7 User interface

### 3.7.1 User interface after Startup

#### User interface after startup

If automatic user login is activated, and the last user who logged in was of the **Operator** type, then the product displays the **Measure** menu with the workspace and the Inspector after starting up.









If automatic user login is not activated, then the product opens the **User login** menu.

**Further information:** "User login menu", Page 36

### 3.7.2 Main menu of the user interface

#### Main menu operating elements

Control	Function
	<b>Message</b> Display of an overview of all messages as well as the number of messages that have not been closed

Control	Function
	<p><b>Measure</b></p> <p>Manual measurement, construction, or definition of features by means of measuring programs and predefined geometries</p> <p><b>Further information:</b> "Measure menu", Page 27</p>
	<p><b>Measurement report</b></p> <p>Creation of measurement reports based on templates; creation and management of measurement report templates</p> <p><b>Further information:</b> "Measurement report menu", Page 33</p>
	<p><b>File management</b></p> <p>Management of the files that are available on the product</p> <p><b>Further information:</b> "File management menu", Page 35</p>
	<p><b>User login</b></p> <p>Login and logout of the user</p> <p><b>Further information:</b> "User login menu", Page 36</p>
	<div style="border: 1px solid black; padding: 5px;"> <p> If a user with additional permissions ( Setup or OEM user type) is logged in, then the gear symbols appears.</p> </div>
	<p><b>Settings</b></p> <p>Settings of the product, such as setting up users, configuring sensors, or updating the firmware</p> <p><b>Further information:</b> "Settings menu", Page 37</p>
	<p><b>Switch-off</b></p> <p>Shutdown of the operating system or activation of power-saving mode</p> <p><b>Further information:</b> "Switch-off menu", Page 38</p>

### 3.7.3 Measure menu

#### Activation



- ▶ Tap **Measure** in the main menu
- > The user interface for measuring, constructing, and defining is displayed

### Measure menu with QUADRA-CHEK 3000 VED software option

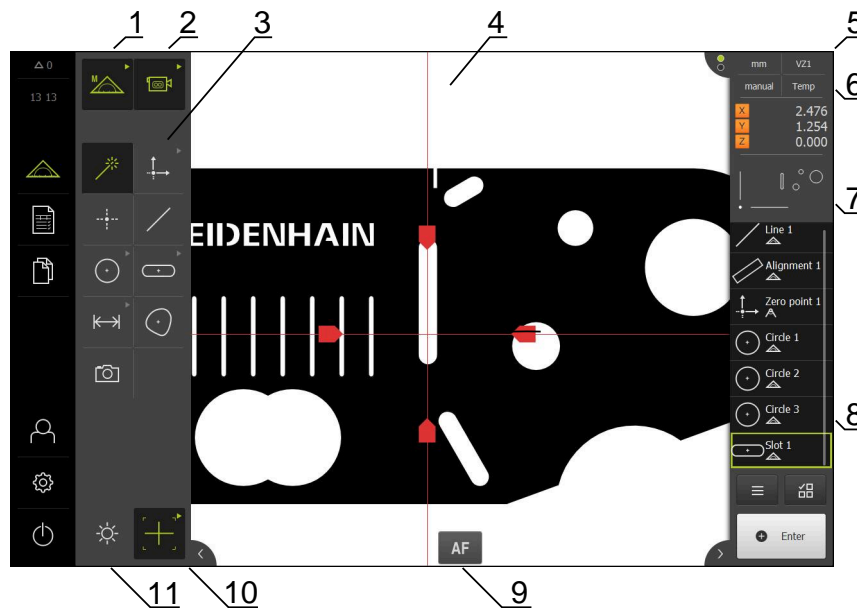
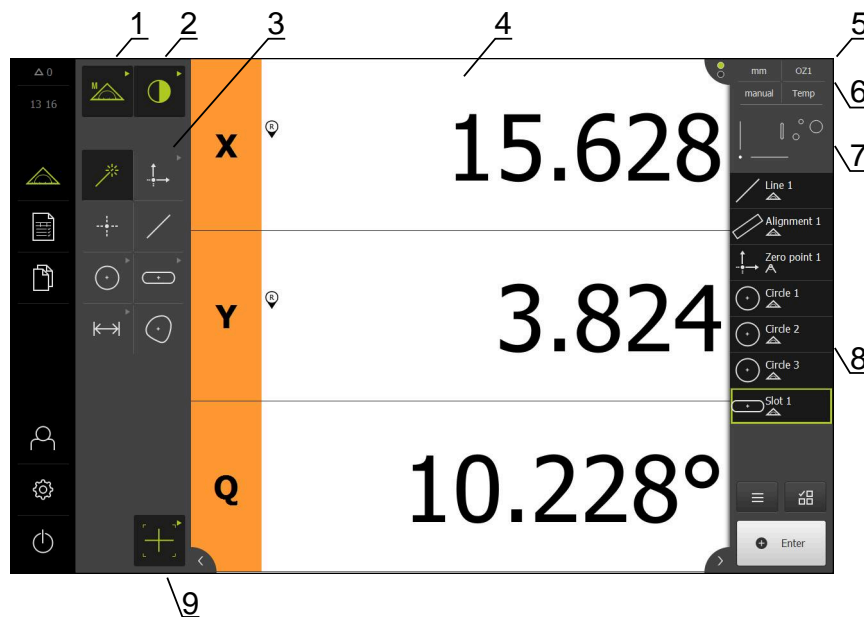


Figure 4: **Measure** menu with QUADRA-CHEK 3000 VED software option

- 1 Function palette providing functions for manual measuring and defining
- 2 Sensor palette from which you can select the sensor for measuring point acquisition (software option)
- 3 Geometry palette from which you can select the geometry to be measured, constructed, or defined
- 4 Workspace, e.g. with live image or features view (graphical representation)
- 5 Inspector (includes 6, 7, 8)
- 6 Quick access menu for basic settings
- 7 Preview of the views currently not displayed in the workspace (live image preview, position preview, or features preview)
- 8 Feature list (measured, constructed, and defined features) or program step list (current measuring program)
- 9 Controls and settings specific to the selected sensor or measuring tool, e.g. Autofocus (software option)
- 10 Tool palette for selecting and configuring the measuring tool (sensor-specific)
- 11 Lighting palette providing settings for lighting adjustment (sensor-specific)

## Measure menu with QUADRA-CHEK 3000 OED software option

Figure 5: **Measure** menu with QUADRA-CHEK 3000 OED software option

- 1 Function palette providing functions for manual measuring and defining
- 2 Sensor palette from which you can select the sensor for measuring point acquisition (software option)
- 3 Geometry palette from which you can select the geometry to be measured, constructed, or defined
- 4 Workspace, e.g. with actual position display (current axis position) or features view (graphical representation)
- 5 Inspector (includes 6, 7, 8)
- 6 Quick access menu for basic settings
- 7 Preview of the view currently not displayed in the workspace (position preview or features preview)
- 8 Feature list (measured, constructed, and defined features) or program step list (current measuring program)
- 9 Tool palette for selecting and configuring the measuring tool (sensor-specific)

### Measure menu with QUADRA-CHEK 3000 3D software option

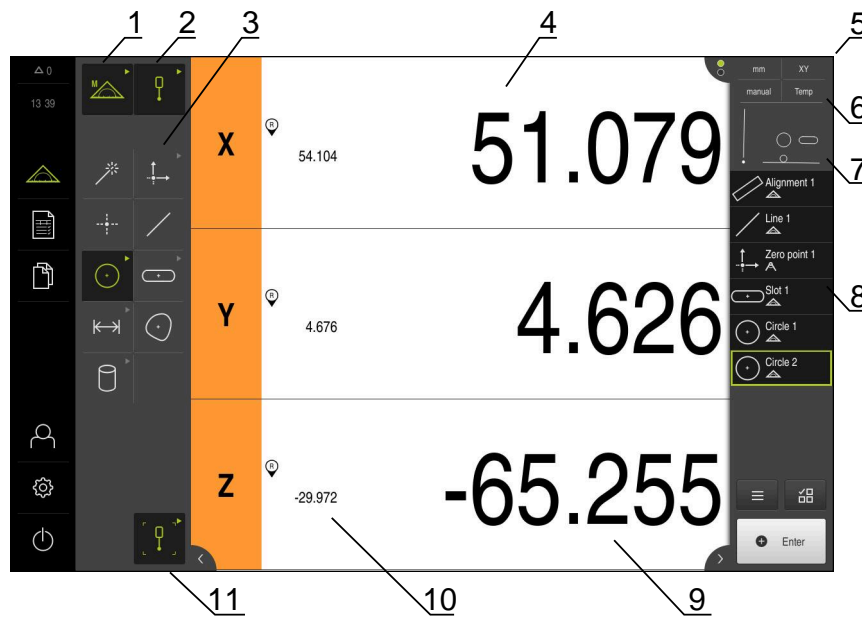


Figure 6: **Measure** menu with QUADRA-CHEK 3000 3D software option

- 1 Function palette providing functions for manual measuring and defining
- 2 Sensor palette from which you can select the sensor for measuring point acquisition (software option)
- 3 Geometry palette from which you can select the geometry to be measured, constructed, or defined
- 4 Workspace, e.g. with position display (axis position) or features view (graphical representation)
- 5 Inspector (includes 6, 7, 8)
- 6 Quick access menu for basic settings
- 7 Preview of the view currently not displayed in the workspace (position preview or features preview)
- 8 Feature list (measured, constructed, and defined features) or program step list (current measuring program)
- 9 Current axis position
- 10 Position of the last measuring point
- 11 The tool palette allows you to select and calibrate the stylus (sensor-specific)

## Function palette

In the function palette, you can select the function to be used for creating a new feature.

### Selecting the function



- ▶ Tap the control showing the current function, e.g. **Manual measuring**
- > The function palette displays the available functions
- ▶ Select the desired function

### Controls of the function palette

#### Manual measuring



#### Defining



**Further information:** "Manual measuring function", Page 38

**Further information:** "The Define function", Page 59

## Sensor palette (software option)

The sensor palette allows you to select the sensor to be used for measuring point acquisition. If only one sensor is available, it will be selected automatically.

### Prerequisites

- The sensor is connected to the product
- The corresponding software option has been enabled

### Selecting the sensor



- ▶ Tap the control showing the current sensor, e.g. **VED sensor**
- > The sensor palette displays the available sensors
- ▶ Select the desired sensor
- > The sensor is activated
- > The geometry palette and the sensor-specific tool palette are displayed

### Controls of the sensor palette

#### Video edge detection (VED)



#### Optical edge detection (OED)



#### Touch probe (TP)



**Further information:** "Controls for measuring with an OED sensor", Page 55

**Further information:** "Controls for measuring with a VED sensor", Page 39

**Further information:** "Controls for measuring with a TP sensor", Page 57

## Geometry palette

The geometry palette allows you to select the geometry to be measured, constructed, or defined. As an alternative, you can use the automatic geometry detection function called **Measure Magic**. The geometries available on the geometry palette depend on the selected function and the activated sensor.

### Selecting geometry

Some geometries are grouped. Grouped controls are identified by an arrow.



- ▶ If a control is grouped, tap the control that shows an arrow
- ▶ All controls of the group are available for selection
- ▶ Select the desired geometry

### Controls of the geometry palette

#### Measure Magic



#### Zero point



Zero point

#### Alignment



Alignment

#### Reference plane



Ref. plane

Prerequisite for **Reference plane**: The Z axis must have been configured

#### Point



Point

#### Line



#### Circle



Circle

#### Arc



Arc

#### Ellipse



Ellipse

#### Slot



Slot

#### Rectangle



Rectangle

#### Distance



Distance

#### Angle



Angle



## Blob

---



## Plane



## Sphere



## Cone



## Cylinder



Prerequisite for **Plane, Sphere, Cone, Cylinder**: The TP sensor has been activated (software option)

## Snapshot

---



Prerequisite for **Snapshot**: The VED sensor has been activated (software option)

## Tool palette (sensor-specific)

In the tool palette, select the measuring tool to be used for the measuring point acquisition. Each sensor has its own tool palette. In the **Measuring tool settings** dialog box of the tool palette, you can configure measuring tools.

### Prerequisites

- A sensor must have been activated (software option)

### Selecting the measuring tool



- ▶ Tap the control showing the current measuring tool, e.g. the crosshairs or the stylus
- > The tool palette shows all of the available measuring tools and the **Measuring tool settings** dialog box
- ▶ Select the desired measuring tool
- ▶ Change the measuring tool settings, if required
- ▶ Tap **Close**
- > Your changes are applied

**Further information:** "Overview of the VED measuring tools", Page 40

**Further information:** "Overview of the OED measuring tools", Page 55

**Further information:** "Overview of the TP measuring tools", Page 57

## 3.7.4 Measurement report menu

### Activation



- ▶ Tap **Measurement report** in the main menu
- > The user interface for displaying and creating the measurement reports appears

## Short description

Number	Name	Type	X	Y	Size	Form deviation	Tolerance general
34	Circle 5	○	12.6414	4.2742	0.6992	0.0036	
35	Circle 6	○	11.5065	3.7067	0.3437	0.0036	
36	Slot 3	⊖	10.7265	4.0599	0.7438	0.0019	
37	Slot 4	⊖	10.9843	2.9662	0.5945	0.0028	
38	Circle 7	○	11.7901	4.5573	0.2566	0.0024	
39	Slot 5	⊖	10.9847	4.8192	0.3063	0.0021	
40	Line 3	/	8.3816	3.8286	1.3321	0.0000	
41	Line 4	/	9.9967	2.5682	1.3326	0.0000	

Figure 7: **Measurement report** menu

- 1 List of measured features and their properties
- 2 Opens the features preview
- 3 Displays the measurement report templates
- 4 Edit the current template
- 5 Print preview of the current measurement report
- 6 Filter for the list of measured features
- 7 Exports the current measurement report
- 8 Saves the current measurement report
- 9 Display information on the current report

The **Measurement report** menu shows a list of the measured features, depending on the selected measurement report template.

In the **Measurement report** menu, you can select the contents and template to be used for your measurement reports. Measurement reports can be saved, exported, and printed. In the template editor, you can edit measurement report templates and create custom templates.

### 3.7.5 File management menu

#### Calling up



- ▶ Tap **File management** in the main menu
- > The file management user interface is displayed

#### Short description

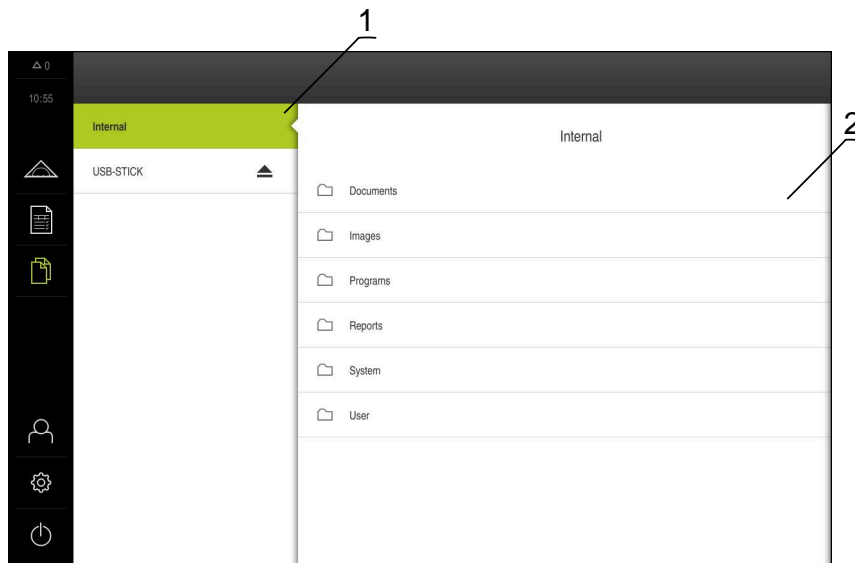


Figure 8: **File management** menu

- 1 List of available storage locations
- 2 List of folders in the selected storage location

The **File management** menu shows an overview of the files stored in the product's memory.

### 3.7.6 User login menu

#### Calling up



- ▶ Tap **User login** in the main menu
- > The user interface for user login and logout is displayed

#### Short description

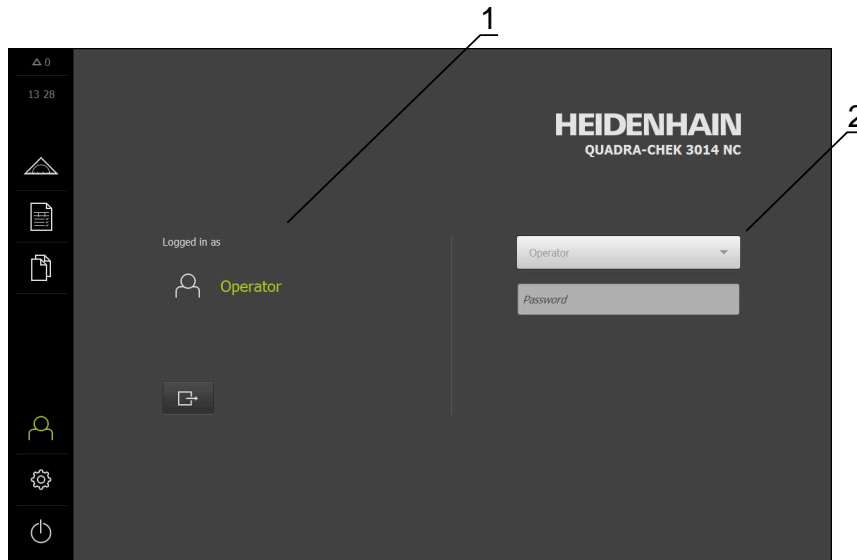


Figure 9: **User login** menu

- 1** Display of the logged-in user
- 2** User login

The **User login** menu shows the logged-in user in the column on the left. The login of a new user is displayed in the right-hand column.

To log in another user, the logged-in user must first log out.

**Further information:** "User login and logout", Page 25

### 3.7.7 Settings menu

#### Calling up



- ▶ Tap **Settings** in the main menu
- The user interface for the product settings is displayed

#### Short description

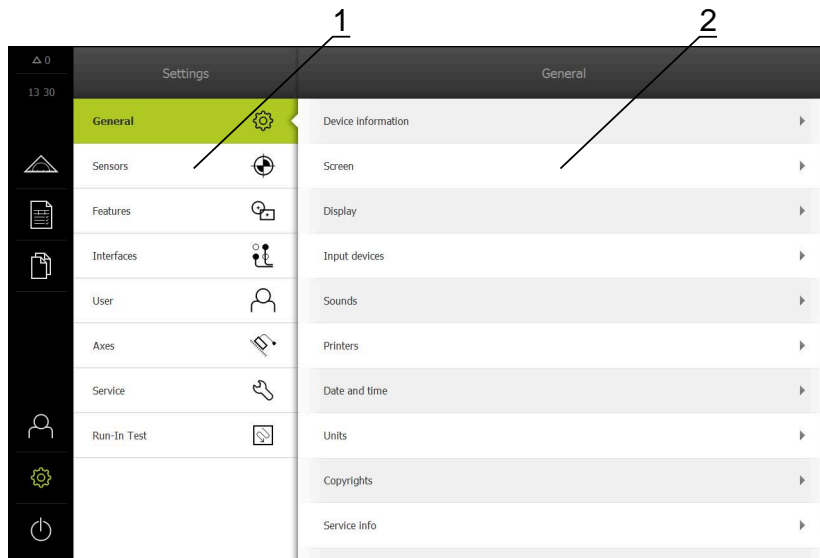


Figure 10: **Settings** menu

- 1 List of setting options
- 2 List of setting parameters

The **Settings** menu shows all of the options for configuring the product. With the setting parameters, you can adapt the product to on-site requirements.



The product provides various authorization levels that grant the user full or restricted access to management and operation functionality.

### 3.7.8 Switch-off menu




#### Activation



- ▶ Tap **Switch off** in the main menu
- > The operating elements for shutting down the operating system, for activating the energy-saving mode and for activating the cleaning mode are displayed

#### Short description

The **Switch off** menu provides the following options:

Operating element	Function
	<p><b>Shut down</b></p> <p>Shuts down QUADRA-CHEK 3000 Demo</p>
	<p><b>Energy saving mode</b></p> <p>Switches the screen off and puts the operating system into energy-saving mode</p>
	<p><b>Cleaning mode</b></p> <p>Switches the screen off; the operating system continues unchanged</p>

**Further information:** "QUADRA-CHEK 3000 Demo – startup and shut-down", Page 24

## 3.8 Manual measuring function

With the **Manual measuring** function, you can perform the following operations on a feature:

- Measure, i.e. create from acquired measuring points
- Construct, i.e. create from existing features



For a detailed description of these activities, please refer to the "Measurement," "Measurement evaluation", and "Measurement report" chapters in the QUADRA-CHEK 3000 operating instructions.

### 3.8.1 Measuring features

To measure a contour, such as a circle, acquire measuring points distributed on the contour. Depending on the type of geometry selected, a certain number of measuring points must be acquired. The positions of these measuring points refer to the coordinate system selected on the product. The product calculates a new feature from the acquired measuring points (point cloud).

To acquire measuring points manually, e.g. by using crosshairs at the measuring microscope or profile projector, proceed as follows:



- ▶ Tap **Measure** in the main menu

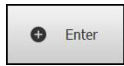


- ▶ Select **Manual measuring** in the function palette



- ▶ Select the desired geometry in the geometry palette e.g. **Circle**

- ▶ On the measuring machine, move to the desired position on the measured object



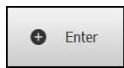
- ▶ To acquire the measuring point, tap **Enter** in the Inspector



- > A new feature is added to the feature list. The symbol of the feature corresponds to the selected geometry

- > The number of acquired measuring points is shown next to the symbol

- ▶ Move to next measuring point



- ▶ To acquire the measuring point, tap **Enter** in the Inspector

- ▶ To acquire more measuring points, repeat these steps

- > When the minimum number of measuring points for the selected geometry has been reached, the **Finish** button appears in the new feature



- ▶ Tap **Finish** to complete the measuring point acquisition

- > The feature is calculated based on the acquired measuring points

- > The measurement result preview appears

### 3.8.2 Measurement with a sensor

For measuring point acquisition, you can use the following sensors on the measuring machine:

- VED sensor, e.g. a camera (QUADRA-CHEK 3000 VED software option)
- OED sensor, e.g. an optical waveguide (QUADRA-CHEK 3000 OED software option)
- TP sensor, e.g. a touch probe (QUADRA-CHEK 3000 3D software option)

Once a sensor is activated, the associated measuring tools (tool palette) and, if applicable, other controls are available.





### 3.8.3 Controls for measuring with a VED sensor

#### Prerequisites




- The VED sensor has been activated (software option)
- A live image is displayed in the workspace

## Overview of the VED measuring tools

If a VED sensor is active, the tool palette includes the following measuring tools.

Control	Measuring tool	Functions and characteristics
	Crosshair	<ul style="list-style-type: none"> <li>Manual acquisition of single measuring points</li> <li>No automatic acquisition of light-to-dark transitions</li> <li>Zoom function available for pixel-precise positioning</li> <li>Alignment and position adjustable</li> </ul>
	Single edge	<ul style="list-style-type: none"> <li>Active measuring tool</li> <li>Automatic acquisition of single measuring points</li> <li>Acquisition of light-to-dark transitions</li> <li>Size of search range adjustable</li> <li>Alignment and position adjustable</li> <li>Supports measuring point detection (CF)</li> </ul>
	Circle	<ul style="list-style-type: none"> <li>Active measuring tool</li> <li>Automatic acquisition of multiple measuring points, e.g. on circles and circular arcs</li> <li>Acquisition of light-to-dark transitions</li> <li>Size of search range adjustable</li> <li>Scan direction adjustable</li> <li>Search range angle adjustable</li> <li>Position adjustable</li> <li>Supports measuring point detection (CF)</li> </ul>
	Buffer	<ul style="list-style-type: none"> <li>Active measuring tool</li> <li>Automatic acquisition of multiple measuring points at edges</li> <li>Acquisition of light-to-dark transitions</li> <li>Size of search range adjustable</li> <li>Alignment and position adjustable</li> <li>Supports measuring point detection (CF)</li> </ul>



Control	Measuring tool	Functions and characteristics
	Contour	<ul style="list-style-type: none"> <li>■ Active measuring tool</li> <li>■ Automatic acquisition of multiple measuring points at contours</li> <li>■ Acquisition of light-to-dark transitions</li> <li>■ Independent positioning of the start and end points of the search range</li> <li>■ Size of search range adjustable</li> <li>■ Scan direction adjustable</li> <li>■ Alignment and position adjustable</li> <li>■ Supports measuring point detection (CF)</li> </ul>
	DXF template	<ul style="list-style-type: none"> <li>■ Visual comparison of contours between template and measured object</li> <li>■ No automatic acquisition of light-to-dark transitions</li> <li>■ Manual and automatic orientation and positioning adjustable</li> </ul>
	Auto contour	<ul style="list-style-type: none"> <li>■ Active measuring tool</li> <li>■ Captures all closed contours in the live image of the camera or within a search area</li> <li>■ Automatic acquisition of multiple measuring points at contours</li> <li>■ Acquisition of light-to-dark transitions</li> <li>■ Size of search area adjustable</li> </ul>

**Further information:** "Using VED measuring tools", Page 42

## Using VED measuring tools

### Moving an image section

The live image can be moved within the field of view because the field of view of the camera image is usually larger than the image section in the workspace.

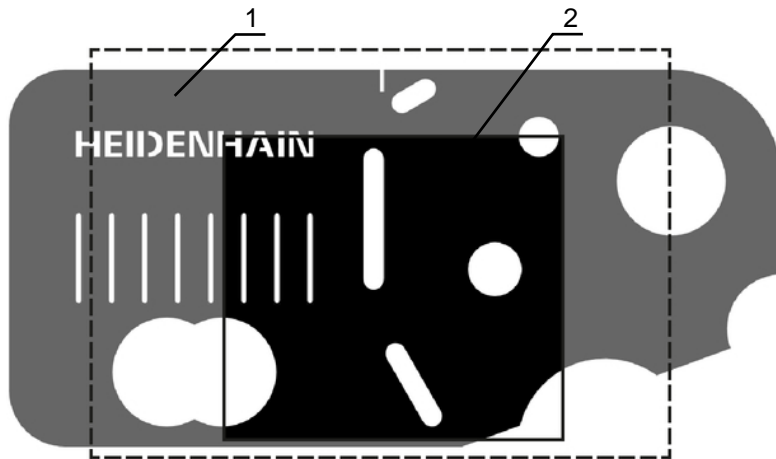


Figure 11: Field of view of the camera and detail of the live image

- 1 Field of view of the camera
- 2 Image section (live image)



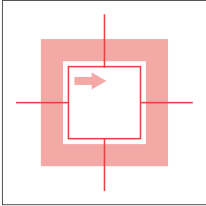
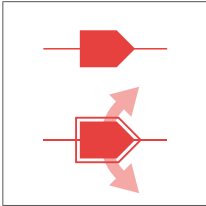
- ▶ In the workspace, drag the image section with two fingers to the desired position



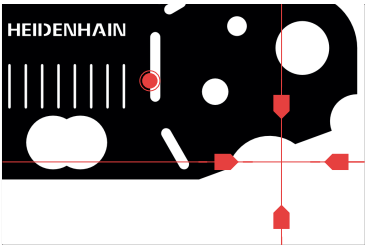
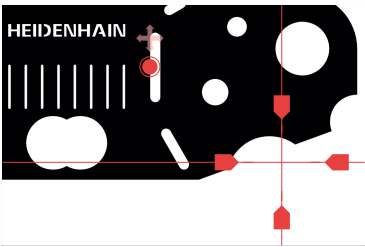
- ▶ In the workspace, drag the image section with the right mouse button to the desired position
- > The image section is moved within the camera's field of view

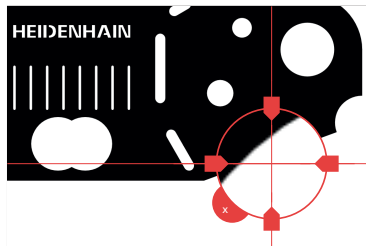
### Search area and handle

If you select a measuring tool in the tool palette, the measuring tool is displayed in the live image. You can adjust the search area and alignment of the measuring tool by using the following controls at the contours of the measured object.

Image	Meaning
	<p><b>Search area</b></p> <p>The following measuring tools have an edge that indicates the search area of the tool:</p> <ul style="list-style-type: none"> <li>■ Single <b>edge</b></li> <li>■ <b>Circle</b></li> <li>■ <b>Buffer</b></li> <li>■ <b>Auto contour</b></li> </ul> <p>The edge of the <b>Contour</b> measuring tool indicates the end point of measuring point acquisition.</p> <p>The scan direction of the search area is indicated by an arrow, if appropriate.</p>
	<p><b>Handles</b></p> <p>The handles are located on the edge or the axes of the measuring tools.</p> <p>Active handles are shown with an outline around the handle.</p> <p>The direction of motion of the active handle is indicated by arrows next to the handle.</p>

### Crosshairs

Display	Activity
	<p><b>Relocating the crosshairs</b></p> <ul style="list-style-type: none"> <li>▶ Tap the desired position in the live image</li> <li>▶ Double-click the desired position in the live image with the left mouse button</li> <li>▶ The crosshairs jump to the selected position</li> </ul>
	<p><b>Shifting the crosshairs</b></p> <ul style="list-style-type: none"> <li>▶ Touch a place in the live image and drag the crosshairs to the desired position</li> </ul>

**Display****Activity****Zooming**

To precisely position the measuring tool, you can use the zoom function to magnify the immediate vicinity of the crosshairs.

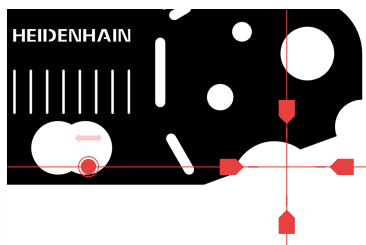


- ▶ Long-press the crosshairs or their vicinity

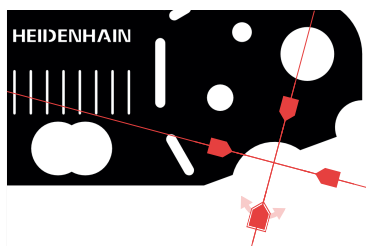


- ▶ Double-click the live image with the right mouse button
- ▶ Drag the magnifying glass with the crosshairs to the desired position
- > The crosshairs move with motion reduction
- ▶ To exit the zoom function, tap **X** on the edge of the magnifying glass

You can change the motion reduction of the zoom function in the settings of the measuring tool.

**Moving the crosshairs in an axis**

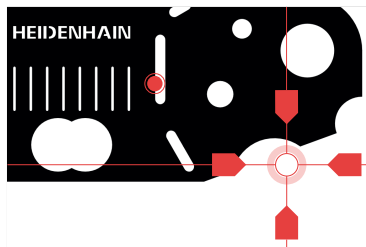
- ▶ Touch an axis of the crosshairs and drag the crosshairs along the axis to the desired position
- > The crosshairs move with motion reduction

**Aligning the crosshairs**

- ▶ Touch a handle of the crosshairs and drag the crosshairs to the desired orientation

## Single edge

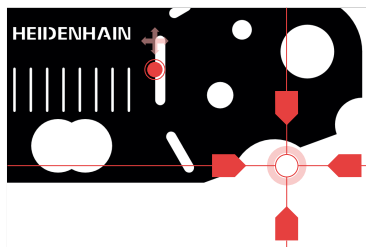
### Display



### Activity

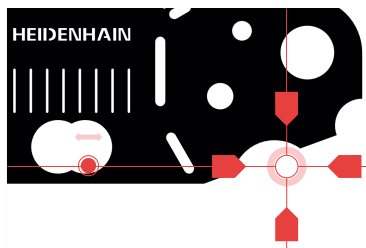
#### Relocating the single edge

- ▶ Tap the desired position in the live image
- ▶ Double-click the desired position in the live image with the left mouse button
- > The single edge jumps to the selected position



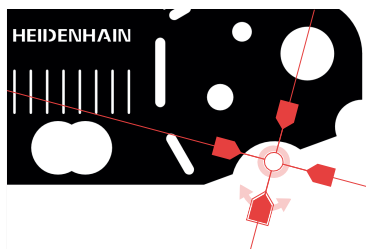
#### Shifting the single edge

- ▶ Touch a place in the live image and drag the single edge to the desired position



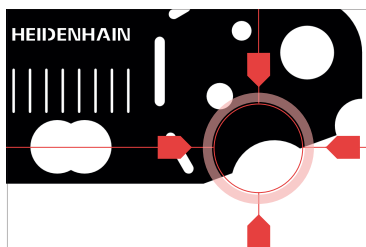
#### Moving the single edge in an axis

- ▶ Touch an axis of the single edge and drag the single edge along the axis to the desired position
- > The single edge moves with motion reduction



#### Aligning the single edge

- ▶ Touch a handle of the single edge and drag the single edge to the desired orientation

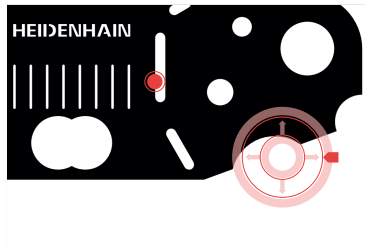


#### Resizing the search range

- ▶ Touch the edge of the search range and drag it to the desired size

## Circle

### Display



### Activity

#### Relocating the circle

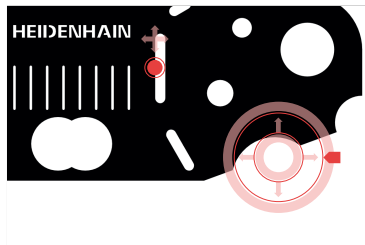


- ▶ Tap the desired position in the live image



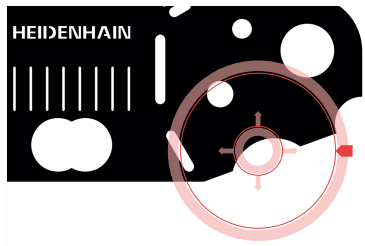
- ▶ Double-click the desired position in the live image with the left mouse button

- > The circle jumps to the selected position



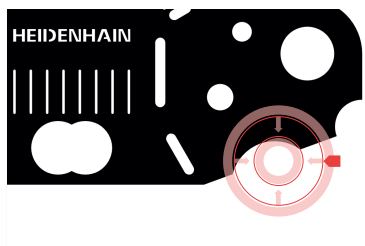
#### Shifting the circle

- ▶ Touch a place in the live image and drag the circle to the desired position



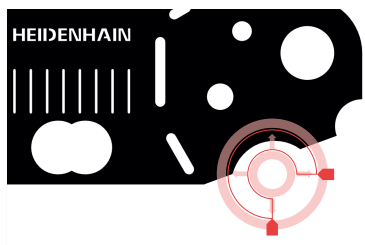
#### Resizing the search range

- ▶ Touch the outer edge of the search range and drag it to the desired size
- > The size of the inner edge changes proportionally
- ▶ Touch the inner edge of the search range and drag it to the desired size



#### Reversing the scan direction of the search range

- ▶ Touch the inner edge of the search range and drag it over the outer edge
- > The arrows indicate the changed scan direction



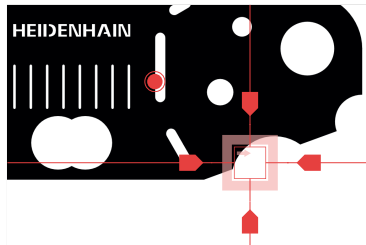
#### Adjusting the search range angle

To limit the search range, you can adjust the search range angle. This makes it possible, for example, to capture measuring points on circular arcs.

- ▶ Touch the handle of the circle and drag the handle along the outer edge
- > The search range is inside the circular arc delimited by the handles

## Buffer

### Display



### Activity

#### Relocating the buffer

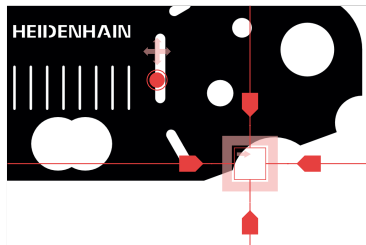


- ▶ Tap the desired position in the live image



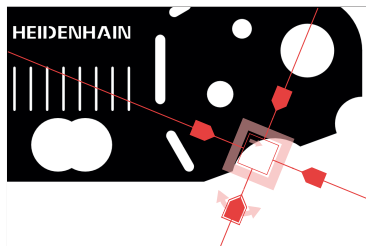
- ▶ Double-click the desired position in the live image with the left mouse button

- > The buffer jumps to the selected position



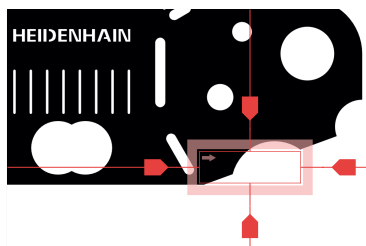
#### Shifting the buffer

- ▶ Touch a place in the live image and drag the buffer to the desired position



#### Aligning the buffer

- ▶ Touch a handle of the buffer and drag the buffer to the desired orientation

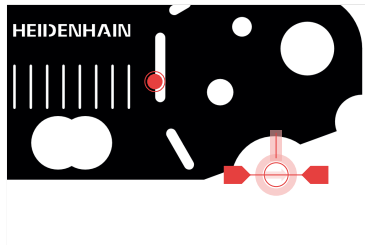


#### Resizing the search range

- ▶ Touch the edge of the search range and drag it to the desired size
- > The search range is changed along the axis at an equal distance from the center

## Contour

### Display



### Activity

#### Relocating the contour

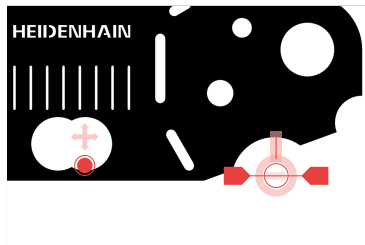


- ▶ Tap the desired position in the live image



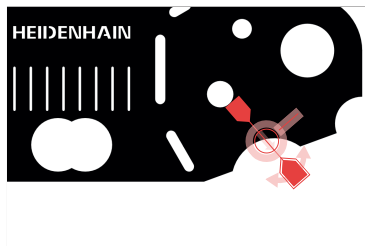
- ▶ Double-click the desired position in the live image with the left mouse button

- > The contour jumps to the selected position



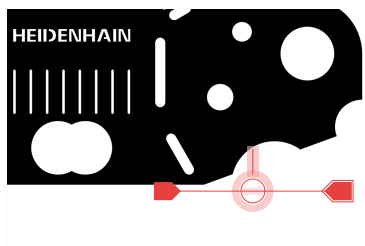
#### Shifting the contour

- ▶ Touch a place in the live image and drag the contour to the desired position



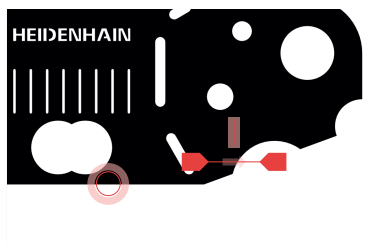
#### Aligning the contour

- ▶ Touch a handle of the contour and drag the contour to the desired orientation



#### Resizing the contour

- ▶ Touch a handle of the contour and drag the contour to the desired size
- > The contour is changed along the axis at an equal distance from the center

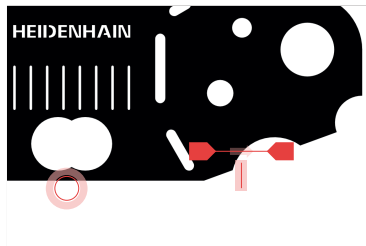


#### Separating start point and end point

To measure a contour, you can separate the start point and the end point of measuring point acquisition. The measuring points are acquired between the contour and the edge of the circle, depending on the search direction.

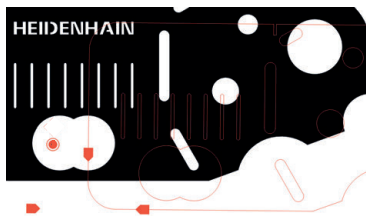
- ▶ Touch the search range (circle) and drag it to the desired position
- > The position of the contour remains unchanged



**Display****Activity****Adjusting the search direction**

The indicator at the contour shows the search direction along the measured object for the acquisition of measuring points. The measuring points are acquired between the contour as the start point and the circle as the end point.

- ▶ Touch the indicator at the contour and drag the indicator to the other side of the contour
- > The search direction of the measuring point acquisition is changed

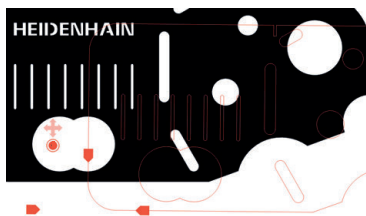
**DXF template****Display****Activity****Displacing the template**

- ▶ Tap the desired position in the live image

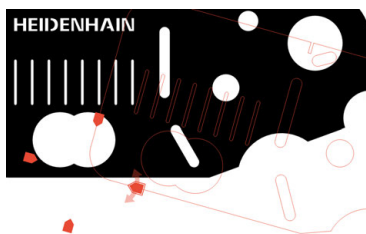


- ▶ Double-click the desired position in the live image with the left mouse button

- > The template jumps to the selected position

**Moving the template**

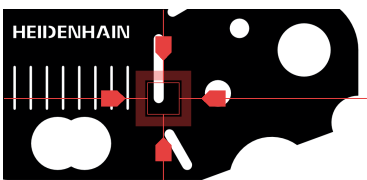


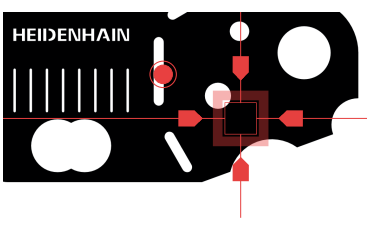


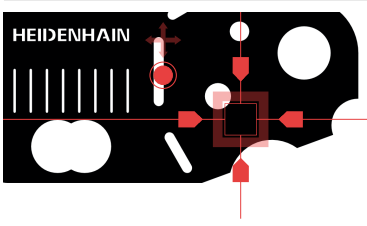
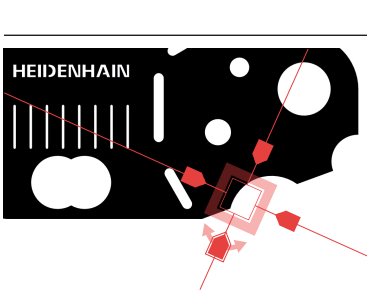
- ▶ Touch a place in the live image and drag the template to the desired position

**Aligning the template**

- ▶ Touch a handle of the template and drag the template to the desired orientation

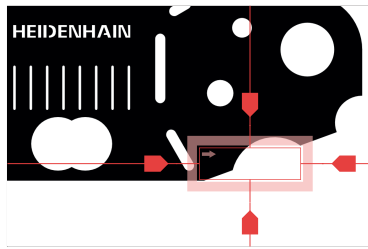
## Auto contour

The **Auto contour** measuring tool captures any closed contours that are located within a defined search area or the entire live image of the camera. Detected contours are displayed with a green outline.

Image	Activity
	<h3 data-bbox="647 517 983 555">Displaying the search area</h3> <ul style="list-style-type: none"> <li data-bbox="647 577 1158 842">  <ul style="list-style-type: none"> <li data-bbox="762 577 1158 640">▶ To limit the search area, tap <b>Search area</b> in the workspace</li> <li data-bbox="762 645 1129 678">➢ The search area is displayed</li> <li data-bbox="762 683 1169 842">➢ Contours that are completely enclosed in the search area are displayed with a green outline and will be included in the measurement</li> </ul> </li> <li data-bbox="647 853 1174 1155">  <ul style="list-style-type: none"> <li data-bbox="762 853 1174 949">▶ To include all measured objects in the live image of the camera, tap <b>Search area</b> again</li> <li data-bbox="762 954 1098 987">➢ The search area is hidden</li> <li data-bbox="762 992 1174 1155">➢ Contours that are completely located within the live image of the camera are displayed with a green outline and will be included in the measurement</li> </ul> </li> </ul>
	<h3 data-bbox="647 1173 975 1211">Offsetting the search area</h3> <ul style="list-style-type: none"> <li data-bbox="647 1234 1158 1301">  <ul style="list-style-type: none"> <li data-bbox="762 1234 1158 1301">▶ Tap the desired position in the live image</li> </ul> </li> <li data-bbox="647 1346 1185 1435">  <ul style="list-style-type: none"> <li data-bbox="762 1346 1185 1435">▶ Double-click the desired position in the live image with the left mouse button</li> </ul> </li> <li data-bbox="647 1458 1177 1525"> <ul style="list-style-type: none"> <li data-bbox="762 1458 1177 1525">➢ The search area is moved to the selected position</li> </ul> </li> </ul>
	<h3 data-bbox="647 1538 946 1576">Moving the search area</h3> <ul style="list-style-type: none"> <li data-bbox="647 1576 1190 1644">▶ Touch a position in the live image and drag the search area to the desired position</li> </ul>
	<h3 data-bbox="647 1769 959 1807">Aligning the search area</h3> <ul style="list-style-type: none"> <li data-bbox="647 1807 1193 1874">▶ Touch a handle of the search area and drag the search area to the desired orientation</li> </ul>

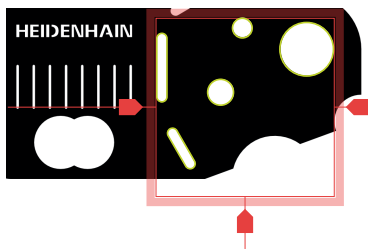
**Image**

**Activity**



**Resizing the search area**

- ▶ Touch the edge of the search area and drag it to the desired size
- > The search area is resized along the axis at an equal distance from the search area center








**Confirming the measuring point acquisition**

Detected contours are displayed with a green outline in the live image

- ▶ To acquire a single feature, tap the contour outlined in green
- > The new feature is displayed in the feature list
- ▶ To acquire all features, tap **Enter**
- > The new features are displayed in the feature list




**VED controls in the workspace**

Depending on the selected measuring tool, further controls are available in the workspace.

Control	Function	Available for
	<b>Contrast bar</b> <b>Further information:</b> "Contrast bar", Page 52	<ul style="list-style-type: none"> <li>■ Single edge</li> <li>■ Circle</li> <li>■ Buffer</li> <li>■ Contour</li> </ul>
	<b>Edge detection mode</b> <b>Further information:</b> "Edge detection mode", Page 52	<ul style="list-style-type: none"> <li>■ Circle</li> <li>■ Buffer</li> <li>■ Contour</li> </ul>
	<b>Autofocus (AF)</b> <b>Further information:</b> "Autofocus (software option)", Page 53	<ul style="list-style-type: none"> <li>■ Crosshair</li> <li>■ Single edge</li> <li>■ Circle</li> <li>■ Buffer</li> <li>■ Contour</li> </ul>
	<b>Search area</b> <b>Further information:</b> "Auto contour", Page 50	<ul style="list-style-type: none"> <li>■ Auto contour</li> </ul>
	<b>Measuring point detection</b> <b>Further information:</b> "Measuring point detection (CF)", Page 54	<ul style="list-style-type: none"> <li>■ Single edge</li> <li>■ Circle</li> <li>■ Buffer</li> <li>■ Contour</li> </ul>

### Edge detection mode

By selecting the edge detection mode, you can define the acquisition direction for light-to-dark transitions during automatic edge detection.

Control	Function	Available for
	<ul style="list-style-type: none"> <li>Edge detection mode</li> </ul>	<ul style="list-style-type: none"> <li>Circle</li> <li>Buffer</li> <li>Contour</li> </ul>
	<ul style="list-style-type: none"> <li>Light-to-dark edge detection</li> </ul>	
	<ul style="list-style-type: none"> <li>Edge detection in both directions (automatic)</li> </ul>	

### Contrast bar

You can adjust the contrast threshold continuously using the **Contrast bar** slider.

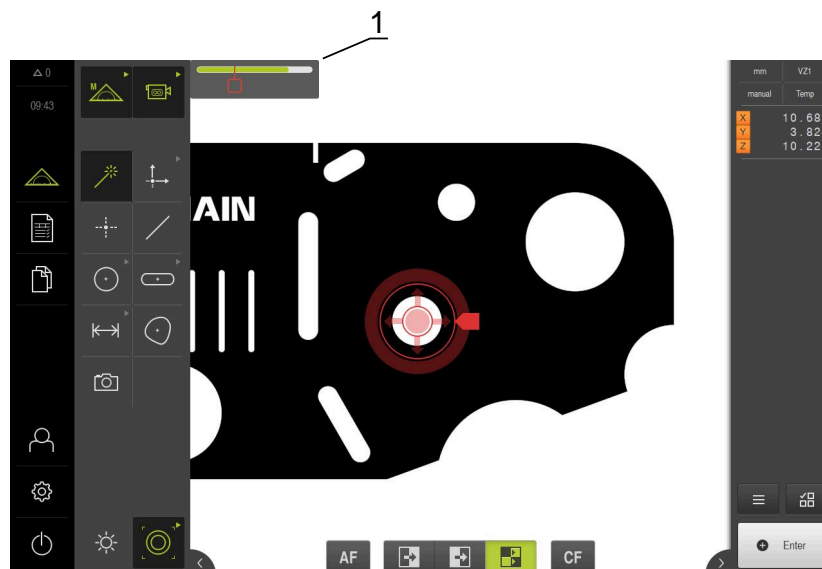



Figure 12: **Measure** menu with **Contrast bar**

#### 1 Slider

Operating element	Function	Available for
	<p><b>Contrast bar</b></p> <p>The position of the slider corresponds to the current contrast threshold</p> <p>The colored section corresponds to the value range between minimum and maximum contrast</p>	<ul style="list-style-type: none"> <li>Single edge</li> <li>Circle</li> <li>Buffer</li> <li>Contour</li> </ul>

### Showing or hiding the contrast bar in the workspace

- ▶ In the quick access menu, drag the **ON/OFF** slider to the desired position

### Modifying the contrast threshold

If you change the position of the measuring tool, the minimum and maximum contrasts are redetermined automatically. The contrast bar displays the determined value range as a colored section. The color of this section indicates whether the contrast threshold is within the permissible range:

- Green: The contrast threshold is within the permissible range; a measuring point acquisition is possible
- Gray: The contrast threshold is not within the permissible range; a measuring point acquisition is not possible
- ▶ In order to acquire measuring points, make sure to drag the slider into the colored section
- > The section is then displayed in green
- > The contrast threshold is within the permissible range



Individual settings determine whether an operator of the **Operator** type may adjust the contrast threshold or not.

### Autofocus (software option)

The **Autofocus (AF)** function helps you determine the focal plane. A wizard guides you through this procedure. While you move the measurement tool on the z axis, the product determines the position in which the contours of the measured object are best in focus.

#### Prerequisites

- Z axis has been configured
- The VED sensor has been activated (software option)
- **Autofocus (AF)** function is enabled (software option)

Control	Function	Available for
<b>AF</b>	<b>Autofocus</b> Starts the wizard for determining the focal plane	<ul style="list-style-type: none"> <li>■ Crosshair</li> <li>■ Single edge</li> <li>■ Circle</li> <li>■ Buffer</li> <li>■ Contour</li> </ul>

### Determining the focal plane



- ▶ Tap **Measure** in the main menu



- ▶ Select **Manual measuring** in the function palette

- ▶ Select one of the following measuring tools
  - Crosshair
  - Single edge
  - Circle
  - Buffer
  - Contour



- ▶ Tap **Autofocus**
- ▶ Follow the instructions of the wizard
- The wizard determines the optimum position on the Z axis



- ▶ Tap **Close** to close the wizard
- ▶ Move to the determined Z axis position

### Measuring point detection (CF)

The **Measuring point detection (CF)** function finds and identifies measuring points within the search area of the measuring tool. When you move the measuring tool or adjust the search area, the product runs a new search. You can acquire the displayed measuring points as usual.



The measuring point detection function helps you to detect contours at low contrasts. Activating this function can affect the processing power, however.

Control	Function	Available for
	<b>Measuring point detection</b> Activates measuring point detection within the search area of the measuring tool.	<ul style="list-style-type: none"> <li>■ Single edge</li> <li>■ Circle</li> <li>■ Buffer</li> <li>■ Contour</li> </ul>

### Activating measuring point detection

- ▶ Select one of the following measuring tools
  - Single edge
  - Circle
  - Buffer
  - Contour



- ▶ Tap **Measuring point detection**
- ▶ Position the measuring tool above the desired contour
- The detected measuring points are marked with a red square
- ▶ Tap **Enter** in the Inspector



- ▶ To measure the displayed points, tap **Finish** in the new feature



- ▶ To deactivate the function, tap **Measuring point detection** again




### 3.8.4 Controls for measuring with an OED sensor

#### Prerequisites

- The OED sensor has been activated (software option)

#### Overview of the OED measuring tools

If an OED sensor is activated, the tool palette includes the following measuring tools.

Symbol	Measuring tool	Functions and characteristics
	Crosshair	<ul style="list-style-type: none"> <li>■ Manual acquisition of single measuring points</li> <li>■ No automatic acquisition of light-to-dark transitions</li> </ul>
	OED	<ul style="list-style-type: none"> <li>■ Active measuring tool</li> <li>■ Acquisition of light-to-dark transitions</li> <li>■ Buffering of a single measuring point (manual confirmation required)</li> </ul> <p>If the OED sensor traverses an edge, a measuring point is buffered in the clipboard. If the OED sensor traverses a further edge, the buffered measuring point is overwritten. By tapping <b>Enter</b>, the previously buffered measuring point is added to the feature calculation.</p>
	Auto OED	<ul style="list-style-type: none"> <li>■ Active measuring tool</li> <li>■ Automatic acquisition of measuring points, e.g. on circles and circular arcs</li> <li>■ Acquisition of light-to-dark transitions</li> </ul> <p>If the OED sensor traverses an edge, a measuring point is automatically acquired and added to the feature calculation.</p>

## Configuring OED measuring tools

In the **Measuring tool settings** dialog, you can adjust the contrast settings and the OED offset settings using a teach sequence. These settings apply to all OED measuring tools, regardless of which measuring tool was selected for the teach sequence. All changes are transferred to the **Settings** menu.

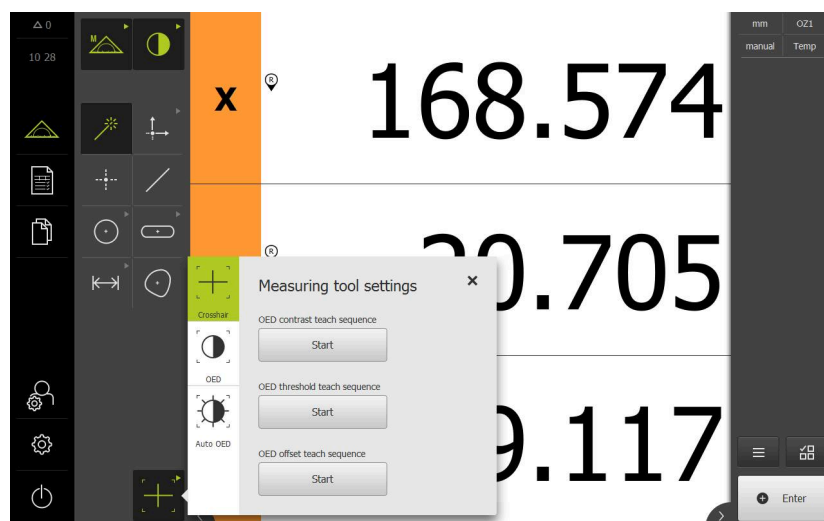





Figure 13: **Measuring tool settings** dialog for OED measuring tools

- ▶ In the quick access menu, select the magnification that is set on the measuring machine
- ▶ In the **tool palette**, select any desired OED measuring tool, e.g. **Auto OED**
- ▶ The **Measuring tool settings** dialog shows the available parameters
- ▶ Determine the desired parameters during the teach sequence
- ▶ Tap **Close** to close the dialog
- ▶ The parameters are saved for the selected magnification
- ▶ Repeat this procedure for all available magnifications

Operating element	Meaning
	<b>OED contrast teach sequence</b> Starts the teach sequence for adjusting the contrast settings to the current light conditions
	<b>OED threshold teach sequence</b> Starts the teach sequence for adjusting the threshold settings for edge detection
	<b>OED offset teach sequence</b> Starts the teach sequence for determining the offset between the crosshairs and the OED sensor





### 3.8.5 Controls for measuring with a TP sensor

#### Prerequisites

- The TP sensor has been activated (software option)
- At least one stylus has been created in the device settings

#### Overview of the TP measuring tools

If a TP sensor is activated, the tool palette includes all styli for which you created settings. In the tool palette, you can select the stylus to be used for the measuring point acquisition. In the **Measuring tool settings** dialog, you can calibrate the selected stylus.

Control	Function
	Straight stylus
	Star-type stylus

#### Calibrating a stylus

Before you can use a stylus for measuring, it must be calibrated. For this purpose, measure the calibration sphere whose diameter you indicated in the device settings. Place at least three measuring points on the circumference and one on the top of the calibration sphere.

The first stylus you calibrate is defined as the main stylus. All other styli refer to the main stylus. If you re-calibrate the main stylus, you need to re-calibrate the other styli as well.



If you are using a star-type stylus, each stylus tip must be calibrated.



If you are using an indexed swiveling stylus, repeat the calibration procedure for each axis and each angular value required for measurement.

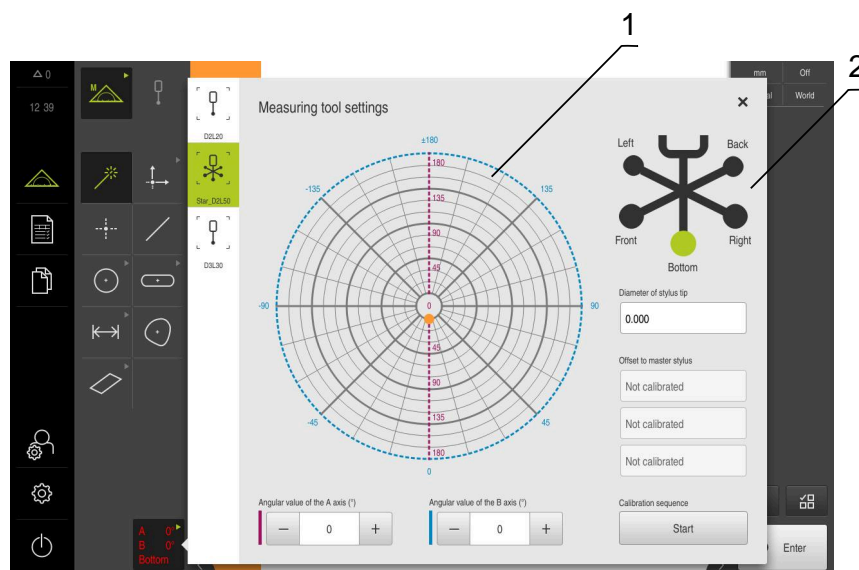


Figure 14: **Measuring tool settings** dialog for TP measuring tools

- 1 Graphical representation for selection of the angle values for indexed swiveling styli
- 2 Graphical representation for selection of the stylus tip for star-type styli

In the graphical representation of indexed swiveling styli, you can select a stylus position in order to calibrate it then. The scale corresponds to the range of adjustment of the touch probe head that is indicated in the settings.

The calibrated positions and the selected position are marked by dots. The colors of the dots have the following meaning:

Color	Meaning
Orange	Position has been selected but not yet calibrated
Green	Position has been selected and calibrated
Dark gray	Position has not yet been selected and calibrated

A 0°  
B 0°  
Left

- ▶ Select the desired stylus in the tool palette
- ▶ The **Measuring tool settings** dialog shows the available parameters for the selected stylus
- ▶ If you are using a star-type stylus, tap the first stylus tip in the graphics
- ▶ The selected stylus tip is displayed in green
- ▶ If you are using an indexed swiveling stylus, select the first angular value in the graphical representation or in the input fields
- ▶ Enter the diameter of the stylus tip
- ▶ To start the calibration, tap **Start**
- ▶ Follow the instructions of the wizard
- ▶ If you are using a star-type stylus, repeat this procedure for each stylus tip
- ▶ If you are using an indexed swiveling stylus, repeat the procedure for each axis and each angular value



- > When the icon in the tool bar is displayed in green, the stylus is fully calibrated

## 3.9 The Define function

### Activation



- ▶ Tap **Measure** in the main menu



- ▶ Select **Define** in the function palette
- > The controls and input fields of the **Define** function are displayed

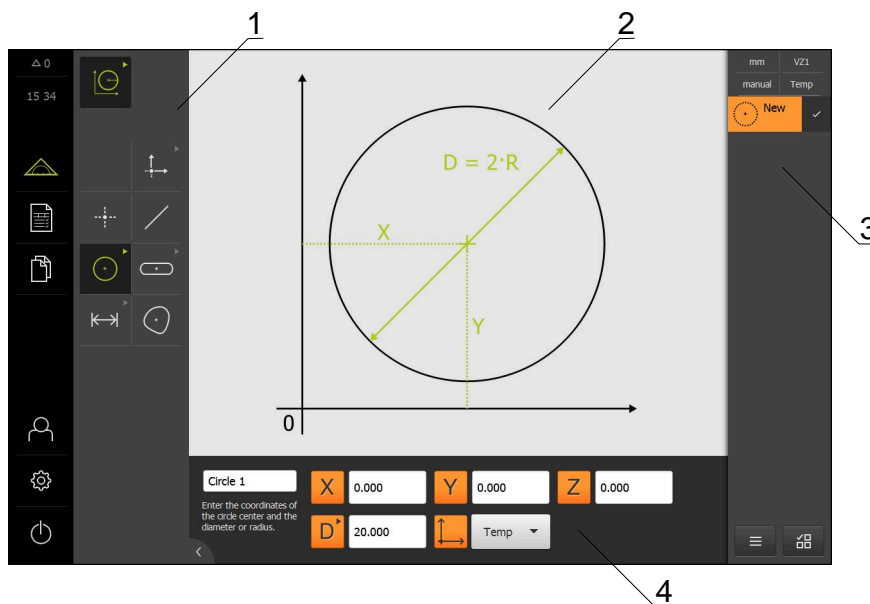


Figure 15: The **Define** function with **circle** geometry

- 1 Geometry palette
- 2 Display of the geometry
- 3 Feature list in the Inspector
- 4 Input fields for the geometry parameters (geometry-specific)






For a detailed description of these activities, please refer to the "Measurement," "Measurement evaluation", and "Measurement report" chapters in the QUADRA-CHEK 3000 operating instructions.

## 3.10 Position display

The unit's position display shows the axis positions and additional information about the configured axes (if applicable).

### 3.10.1 Operating elements of the position display

Symbol	Meaning
	<p>Axis key</p> <p><b>Axis key functions:</b></p> <ul style="list-style-type: none"> <li>■ Tapping the axis key: opens the input field for position value</li> <li>■ Holding down the axis key: sets the current position as zero point</li> </ul>
	Reference mark search performed successfully
	Reference mark search not performed or no reference mark detected

## 3.11 Customizing the workspace

In the **Measure** menu, you can enlarge the workspace by hiding the main menu, the submenu, or the Inspector. In addition, there are several ways to customize the features view.

### Activation



- ▶ Tap **Measure** in the main menu
- > The user interface for measuring, constructing, and defining is displayed

### 3.11.1 Hiding and showing the main menu and submenu



- ▶ Tap the **tab**
- > The main menu is hidden
- ▶ Tap the **tab** again
- > The submenu is hidden
- > The arrow changes direction
- ▶ To show the submenu, tap the **tab**
- ▶ To show the main menu, tap the **tab** again

### 3.11.2 Hiding or displaying the Inspector

The Inspector can only be hidden when using the **Manual measuring** function.



- ▶ Tap the **tab**
- > The Inspector is hidden
- > The arrow changes direction



- ▶ To display the Inspector, tap the **tab**

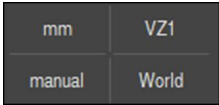
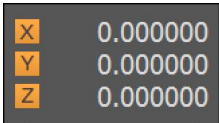
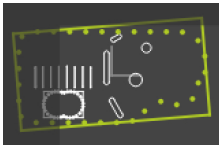

## 3.12 Using the Inspector

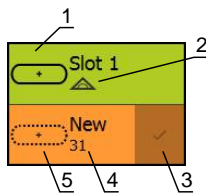
The Inspector is only available in the **Measure** menu.

**Activation**

- ▶ Tap **Measure** in the main menu
- > The user interface for measuring, constructing and defining is displayed




**3.12.1 Controls of the Inspector**

Control	Function
	<p><b>Quick access menu</b></p> <p>The quick access menu displays the current settings for manual measuring, constructing, and defining:</p> <ul style="list-style-type: none"> <li>■ Unit for linear values (Millimeters or Inch)</li> <li>■ Magnification used</li> <li>■ Type of measuring point acquisition (automatic or manual)</li> <li>■ Coordinate system used</li> </ul> <ul style="list-style-type: none"> <li>▶ To adjust the settings of the quick access menu, tap the quick access menu</li> </ul>
	<p><b>Position preview</b></p> <p>The position preview displays the current axis positions. If no reference mark search has been performed, the axis positions are displayed in red.</p> <ul style="list-style-type: none"> <li>▶ To display the position preview in the workspace, tap the <b>Position preview</b></li> <li>&gt; The position display is now shown in the workspace</li> <li>&gt; The current content of the workspace is displayed in the Inspector</li> </ul>
	<p><b>Features preview</b></p> <p>The features preview displays a reduced view of the measured, constructed, and defined features. The current image section of the live image is highlighted.</p> <ul style="list-style-type: none"> <li>▶ To display the features view in the workspace, tap the <b>Features preview</b></li> <li>&gt; The features view is now shown in the workspace</li> <li>&gt; The current content of the workspace is displayed in the Inspector</li> </ul>
	<p><b>Live image preview</b></p> <p>The live image preview displays a reduced view of the live image.</p> <ul style="list-style-type: none"> <li>▶ To display the live image preview in the workspace, tap <b>Live image preview</b></li> <li>&gt; The live image is now displayed in the workspace</li> <li>&gt; The current content of the workspace is displayed in the Inspector</li> </ul>

**Control****Function****Feature list**

The feature list lists all measured, constructed, or defined features. The feature list provides the following information:

- **1:** Feature with symbol, name, and consecutive number
- **2:** Function that was used for creating the feature

Symbol	Meaning
	Measured feature
	Constructed feature
	Defined feature

- **3:** Completes the measuring point acquisition
- **4:** Number of measuring points that have been acquired
- **5:** Newly acquired feature with symbol

Each feature contains details on the measurement results as well as selectable tolerances.

- ▶ To display the measured values and adjust the tolerances, drag a feature into the workspace
- ▶ The **Details** dialog with its **Overview** and **Tolerance** tabs opens in the workspace
- ▶ To select or deselect features, tap the features one after another
- ▶ The selected features are highlighted in green
- ▶ To delete a feature, drag the feature to the right and out of the Inspector

**Measurement result preview**

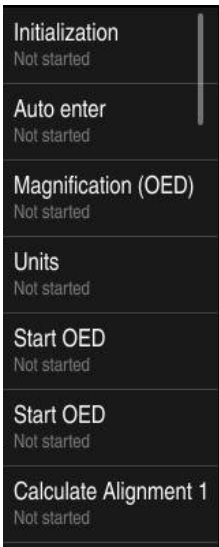

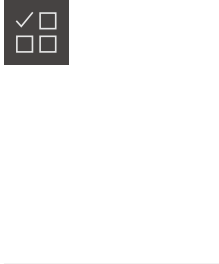
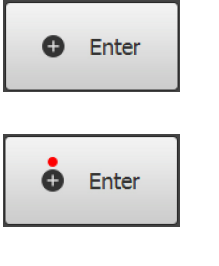
After completion of a measurement process, the measurement result preview appears in the workspace and displays information about the measured feature. For each geometry type, it is possible to define the parameters to be displayed in the measurement result preview. Which parameters are available depends on the specific geometry type.

You can adjust the coordinate system in the measurement result preview.

You can send contents from the measurement result preview to a computer via the RS-232 interface.



For a detailed description of the measured-value output, please refer to the "Measurement evaluation" chapter in the QUADRA-CHEK 3000 Operating Instructions.

Control	Function
	<p><b>Program step list</b></p> <p>The program step list shows all actions that occur during the measurement. It is displayed instead of the feature list in the Inspector.</p> <p>The program steps can be combined and saved as a measuring program.</p>
	<p><b>Auxiliary functions</b></p> <p>The auxiliary functions include the following:</p> <ul style="list-style-type: none"> <li>■ Switching the display between feature list and program step list</li> <li>■ Creating, saving, and opening a program</li> <li>■ Calling the program control in the workspace</li> <li>■ Opening and saving a coordinate system</li> <li>■ Deleting selected features or all features from the feature list</li> </ul>
	<p><b>Feature selection</b></p> <p>Multiple selection of features of the same geometry type</p> <ul style="list-style-type: none"> <li>▶ Tap <b>Feature selection</b></li> <li>▶ To select all features of a geometry type in the feature list, tap the desired geometry type</li> <li>▶ Confirm with <b>OK</b></li> <li>▶ The selected features are highlighted in green</li> </ul>
	<p><b>Enter</b></p> <p>Acquisition of measuring points with the following options:</p> <ul style="list-style-type: none"> <li>■ If measuring point acquisition is deactivated, then the measuring points will be acquired manually</li> <li>■ If automatic measuring point acquisition is active, then a red dot will be shown in the control. The measuring points will be acquired after expiration of the set dead time</li> </ul>

### 3.12.2 Expanding the feature list or program step list

If the feature list or program step list includes at least one feature or program step, it can be expanded.



- ▶ Tap the switch
- > The feature list or program step list is expanded
- > The lower switch is displayed in green



- ▶ Tap the switch
- > The previous view will be restored
- > The upper switch is displayed in green



# 4

**Software  
configuration**

## 4.1 Overview



Make sure that you have read and understood the "Basic operation" chapter before carrying out the actions described below.

**Further information:** "Basic operation", Page 19

Before you can use QUADRA-CHEK 3000 Demo correctly after successful installation, you need to configure QUADRA-CHEK 3000 Demo. This chapter describes how to perform the following settings:

- Setting the language
- Activating software options
- Selecting the product version (optional)
- Copying the configuration file
- Uploading the configuration data

## 4.2 Setting the language

The user interface language is English. You can change to another language, if desired.



- ▶ Tap **Settings** in the main menu



- ▶ Tap **User**
  - > The logged-in user is indicated by a check mark
  - ▶ Select the logged-in user
  - > The language selected for the user is indicated by a national flag in the **Language** drop-down list
  - ▶ Select the flag for the desired language from the **Language** drop-down list
  - > The user interface is displayed in the selected language

### 4.3 Activating software options

With QUADRA-CHEK 3000 Demo, you can also simulate characteristics and functions that are dependent on a software option. To do so, you must enable the software option with a license key. The required license key is stored in a license file in the QUADRA-CHEK 3000 Demo folder structure.

You must read in the license file in order to enable the available software options.



- ▶ Tap **Settings** in the main menu
- > The product settings are displayed

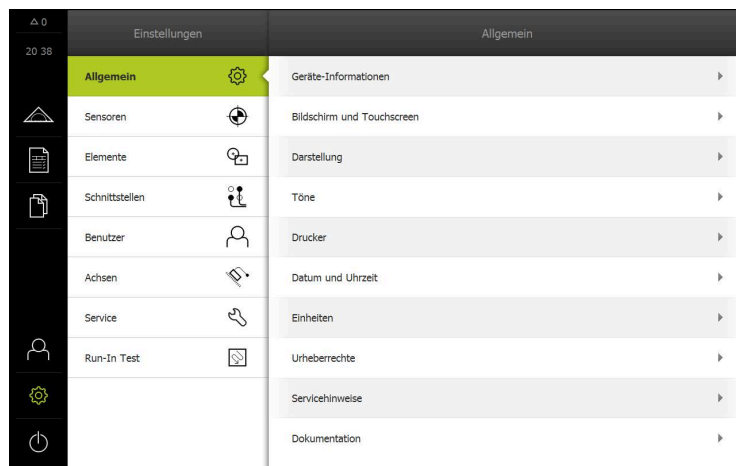


Figure 16: **Settings** menu



- ▶ Tap **Service**
- ▶ Open in sequence:
  - **Software options**
  - **Activate options**
  - Tap **Read license file**
- ▶ In the dialog box, select the storage location:
  - Select **Internal**
  - Select **User**
- ▶ Select the **PcDemoLicense.xml** license file
- ▶ Confirm your selection with **Select**
- ▶ Tap **OK**
- > The license key is activated
- ▶ Tap **OK**
- > You are prompted to restart the product
- ▶ Perform a restart
- > The functions depending on the software options are available

## 4.4 Selecting the product version (optional)

QUADRA-CHEK 3000 is available in different versions. These versions differ in their interfaces for connectible encoders:

In the **Settings** menu, you can select the version that is to be simulated with QUADRA-CHEK 3000 Demo



- ▶ Tap **Settings** in the main menu



- ▶ Tap **Service**
- ▶ Tap **Product designation**
- ▶ Select the desired version
- > You are now prompted to perform a restart
- > QUADRA-CHEK 3000 Demo is ready for use in the desired version

## 4.5 Copying the configuration file

Before you can load the configuration data in QUADRA-CHEK 3000 Demo, you must first copy the downloaded configuration file **DemoBackup.mcc** to an area that can be accessed by QUADRA-CHEK 3000 Demo.

- ▶ Move to the temporary storage folder
- ▶ For example, copy the configuration file **DemoBackup.mcc** to the following folder: **C: ▶ HEIDENHAIN ▶ [product name] ▶ ProductsMGE5 ▶ Metrology ▶ [product abbreviation] ▶ user ▶ User**



In order for QUADRA-CHEK 3000 Demo to access the configuration file **DemoBackup.mcc**, you must retain the following part of the path when you save the file: ▶ **[product name] ▶ ProductsMGE5 ▶ Metrology ▶ [product abbreviation] ▶ user ▶ User.**

- > The configuration file can be accessed by QUADRA-CHEK 3000 Demo

## 4.6 Uploading the configuration data



Before you can upload the configuration data, you must first activate the license key.

**Further information:** "Activating software options", Page 67

In order to configure QUADRA-CHEK 3000 Demo for use on the computer, you must upload the **DemoBackup.mcc** configuration file.



- ▶ Tap **Settings** in the main menu
- > The product settings are displayed

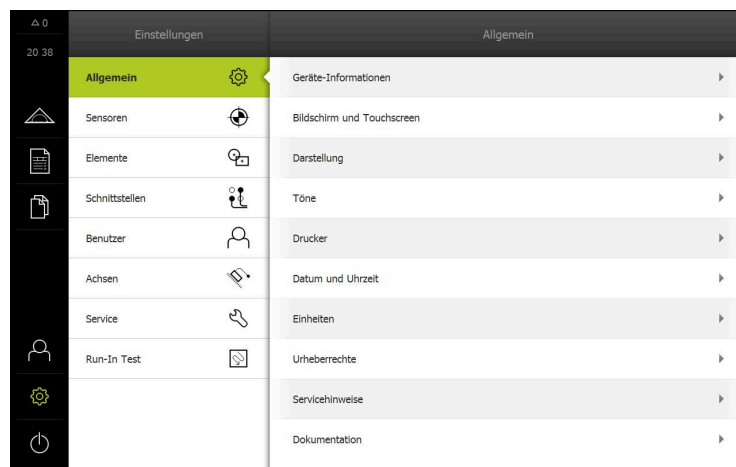


Figure 17: **Settings** menu



- ▶ Tap **Service**
- ▶ Open in succession:
  - **Back up and restore**
  - **Restore settings**
  - **Complete restoration**
- ▶ In the dialog, select the storage location:
  - **Internal**
  - **User**
- ▶ Select the **DemoBackup.mcc** configuration file
- ▶ Confirm your selection with **Select**
- > The settings are applied
- > You are prompted to close the application
- ▶ Tap **OK**
- > QUADRA-CHEK 3000 Demo is closed, and the Microsoft Windows window is closed
- ▶ Restart QUADRA-CHEK 3000 Demo
- > QUADRA-CHEK 3000 Demo is now ready for use



# 5

**Quick Start**

## 5.1 Overview

In this chapter an example is used to describe the steps of a typical measuring sequence. The steps range e.g. from aligning the measured object and measuring the features through to creating the measurement report.



For a detailed description of these activities, please refer to the "Measurement," "Measurement evaluation", and "Measurement report" chapters in the QUADRA-CHEK 3000 operating instructions.



Make sure that you have read and understood the "Basic operation" chapter before carrying out the actions described below.

**Further information:** "Basic operation", Page 19

## 5.2 Conducting a measurement

### 5.2.1 Measuring with a VED sensor

For the measurement of edges and contours with a VED sensor, various measuring tools are available to you for the acquisition of measuring points in the live image.

**Further information:** "Overview of the VED measuring tools", Page 40



The measurements illustrated here are described in detail in the Measurement chapter.



For the measurements described in this section, a virtual camera (Virtual Camera (GigE)) will be used with the depiction of the supplied 2-D demo part.

Application-specific adjustments during commissioning or setup can lead to deviating depictions.

It is possible for the OEM user or the Setup user to switch to the virtual camera at any time. By this means, the depicted examples can be reproduced.



### Aligning the measured object

Before you can evaluate the measuring points, you need to align the measured object. During this process, the coordinate system of the measured object (workpiece coordinate system) is determined, which is specified in the technical drawing.

This makes it possible to compare the measured values with the data in the technical drawing and assess them.

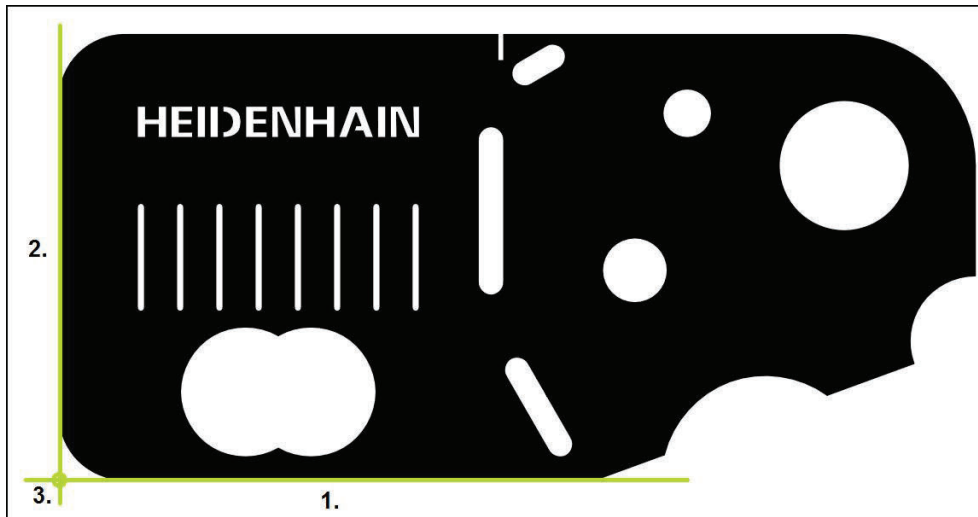


Figure 18: Example of aligning a 2-D demo part

Measured objects are usually aligned in the following steps:

- 1 Measuring the alignment
- 2 Measuring a straight line
- 3 Constructing the zero point



When using the **Manual measuring** function, you can move the image section.

**Further information:** "Moving an image section", Page 42

### Determining the focal plane with the Autofocus function (software option)

The **Autofocus (AF)** function helps you determine the focal plane. A wizard guides you through this procedure. While you move the measurement tool on the z axis, the product determines the position in which the contours of the measured object are best in focus.



- ▶ Tap **Measure** in the main menu



- ▶ Select **Manual measuring** in the function palette

- ▶ Select one of the following measuring tools

- Crosshair
- Single edge
- Circle
- Buffer
- Contour



- ▶ Tap **Autofocus**
- ▶ Follow the instructions of the wizard
- > The wizard determines the optimum position on the Z axis



- ▶ Tap **Close** to close the wizard
- ▶ Move to the determined Z axis position

## Measuring the alignment



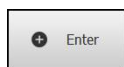
- ▶ If required, select the **XY** projection plane in the quick access menu



- ▶ Select **Alignment** in the geometry palette



- ▶ Select **Buffer** in the tool palette
- ▶ Position the measuring tool above the reference edge
- ▶ To adjust the scanning direction, rotate the measuring tool
- ▶ Expand the measuring tool so that the edge region enclosed in the search area is as large as possible



- ▶ Tap **Enter** in the Inspector
- Multiple measuring points are captured along the edge
- A new feature is displayed in the feature list

**i** Distribute the measuring points along the entire length of the edge. This minimizes the angular error.

- ▶ If the edge is interrupted or not fully displayed in the workspace, reposition the measuring tool and capture more measuring points
- ▶ Tap **Finish** in the new feature
- The alignment is displayed in the feature list
- The measurement result preview is now displayed

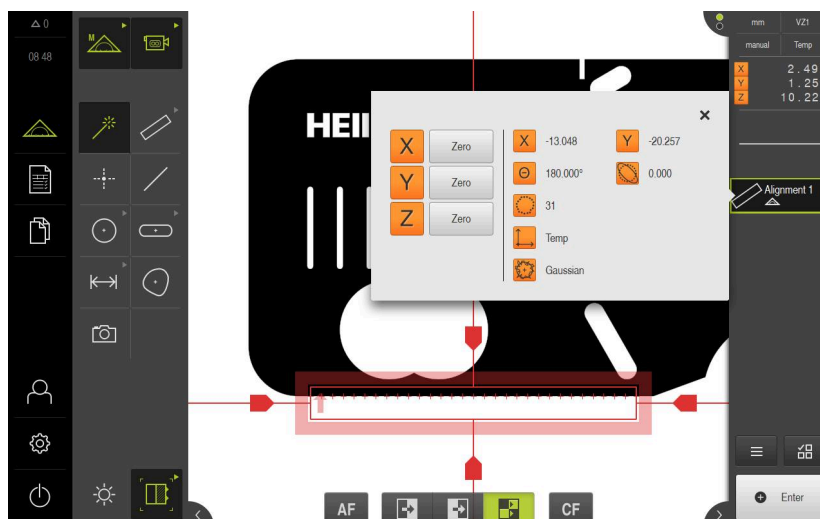


Figure 19: **Alignment** feature in the feature list with **Measurement result preview**

## Measuring a straight line

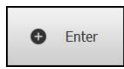
For the second reference edge, you can measure a straight line with the **Buffer** measuring tool, for example.



- ▶ Select **Line** in the geometry palette



- ▶ Select **Buffer** in the tool palette
- ▶ Position the measuring tool above the reference edge
- ▶ To adjust the scanning direction, rotate the measuring tool
- ▶ Expand the measuring tool so that the edge area enclosed in the search range is as large as possible



- ▶ Tap **Enter** in the Inspector
- A new feature is displayed in the feature list



Distribute the measuring points along the entire length of the edge. This minimizes the angular error.

- ▶ If the edge is interrupted or not fully displayed in the workspace, reposition the measuring tool and capture more measuring points



- ▶ Tap **Finish** in the new feature
- The straight line is displayed in the feature list
- The measurement result preview appears

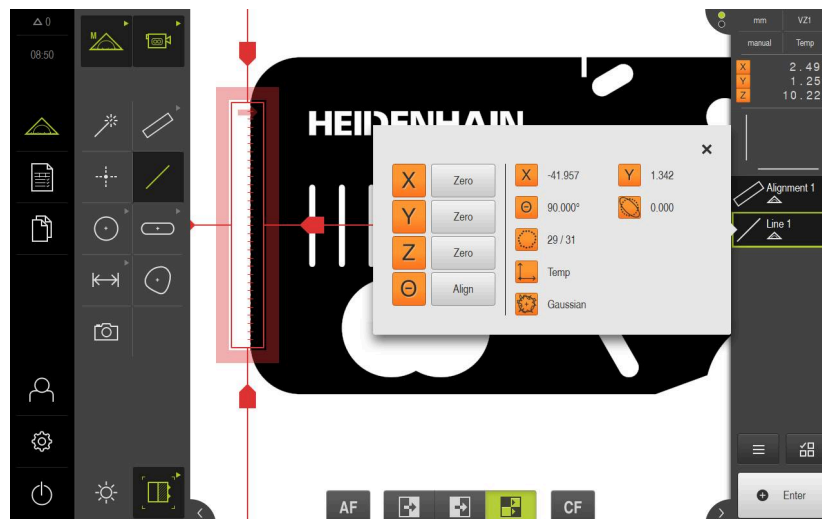


Figure 20: **Line** feature in the feature list with **Measurement result preview**

### Constructing the zero point

Construct the zero point at the point of intersection between the alignment and the straight line.



- ▶ Select **Zero point** in the geometry palette
- ▶ Select the **Alignment** and **Line** features in the Inspector or in the features view

- > The selected features are displayed in green
- > A new feature is displayed in the feature list



- ▶ Tap **Finish** in the new feature
- > The zero point is displayed in the feature list
- > The workpiece coordinate system for the measured object has been determined
- ▶ Tap **Features preview**
- > The coordinate system is shown in the workspace

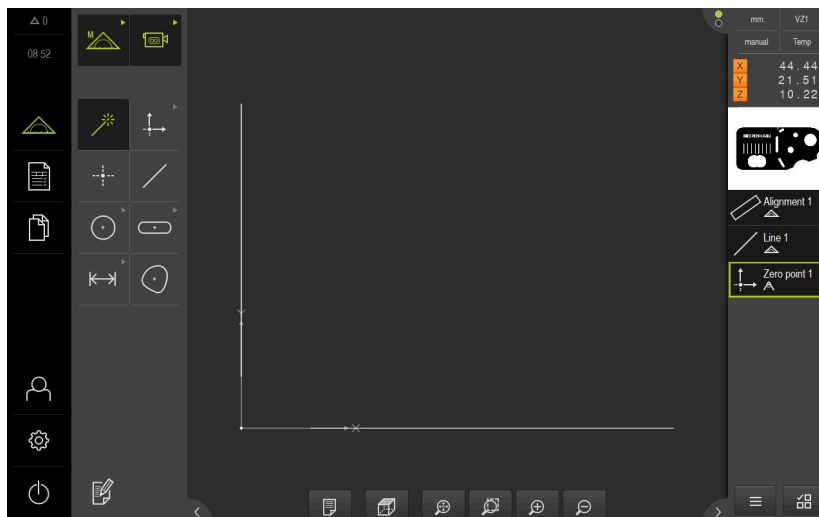


Figure 21: Workspace with zero point displayed in the coordinate system

## Measuring features

To measure features, you can use the geometries of the geometry palette.

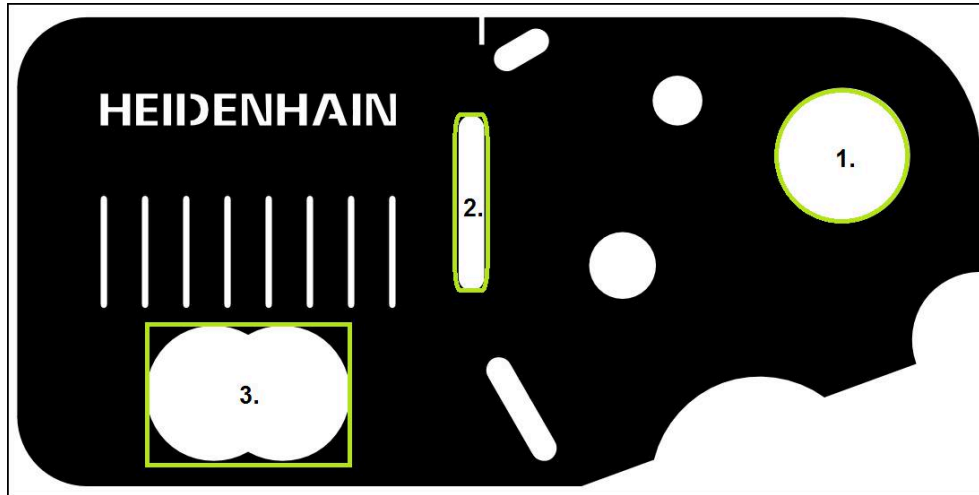


Figure 22: Examples of measuring a 2-D demo part

The section below describes measuring the following features:

- 1 Circle
- 2 Slot
- 3 Blob



When using the **Manual measuring** function, you can move the image section.

**Further information:** "Moving an image section", Page 42

## Measuring a circle

A minimum of three measuring points is required to measure a circle. To acquire the measuring points, you can use the **Circle** measuring tool, for example. Multiple measuring points are automatically distributed along the entire contour according to the specified settings.



- ▶ Tap **Measure** in the main menu



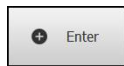
- ▶ Select **Manual measuring** in the function palette
- > The workspace shows the camera's live image



- ▶ Select **Circle** in the geometry palette



- ▶ Select **Circle** in the tool palette
- ▶ Position the measuring tool on the contour
- ▶ Resize the two rings of the measuring tool so that the contour is fully enclosed within the search area between the inner and outer rings



- ▶ Tap **Enter** in the Inspector
- > A new feature is displayed in the feature list
- ▶ Tap **Finish** in the new feature
- > The circle is displayed in the feature list
- > The measurement result preview appears



Figure 23: The circle is displayed in the features preview

## Measuring a slot

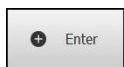
A minimum of five measuring points is required in order to measure a slot. For measuring point acquisition, you can for example use the **Single edge** measuring tool. Place at least two measuring points on the first long side and at least one measuring point on the second long side, and on each arc of the slot.



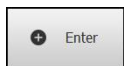
- ▶ Select **Slot** in the geometry palette



- ▶ Select **Single edge** in the tool palette
- ▶ Position the search range of the measuring tool on the contour of the slot
- ▶ Resize the search range



- ▶ Tap **Enter** in the Inspector
- ▶ A new feature is displayed in the feature list
- ▶ Position the measuring tool on the contour of the slot to capture the second measuring point



- ▶ Tap **Enter**
- ▶ To acquire more measuring points, repeat these steps



Distribute the measuring points along the entire length of the first long side, if possible.



- ▶ Tap **Finish** in the new feature
- ▶ The slot is displayed in the feature list
- ▶ The measurement result preview is now displayed

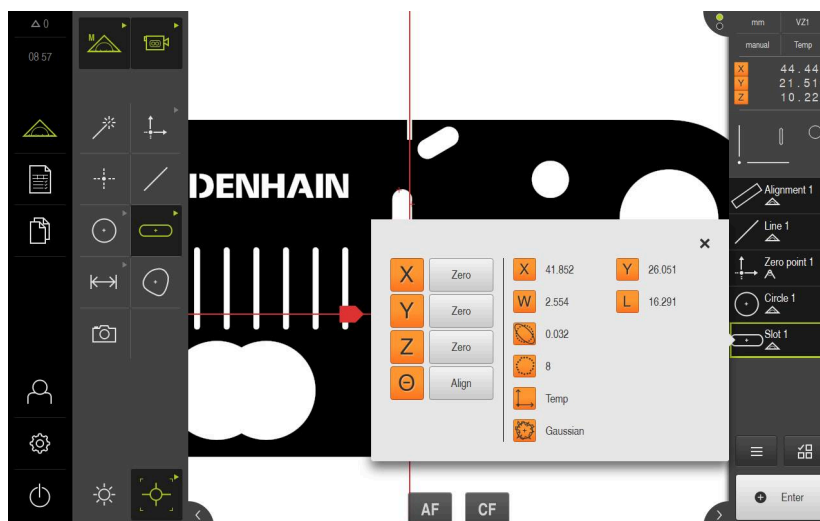


Figure 24: The slot is displayed in the features preview



## Measuring a blob

A minimum of three measuring points is required to measure a blob. To capture the measuring points, you can use e.g. the **Contour** measuring tool. Multiple measuring points are automatically distributed along the entire contour according to the specified settings.



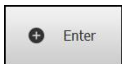
- ▶ Select **Blob** in the geometry palette



- ▶ Select **Contour** in the tool palette
- ▶ Position the measuring tool at any desired location on the contour
- ▶ Resize the search range to enclose only one edge



Make sure that there are no other edges or contours within the search range of the measuring tool.



- ▶ Tap **Enter** in the Inspector
- The measuring points are acquired along the edge until the start point is reached again
- A new feature is displayed in the feature list



- ▶ Tap **Finish** in the new feature
- The blob is displayed in the feature list
- The measurement result preview is now displayed

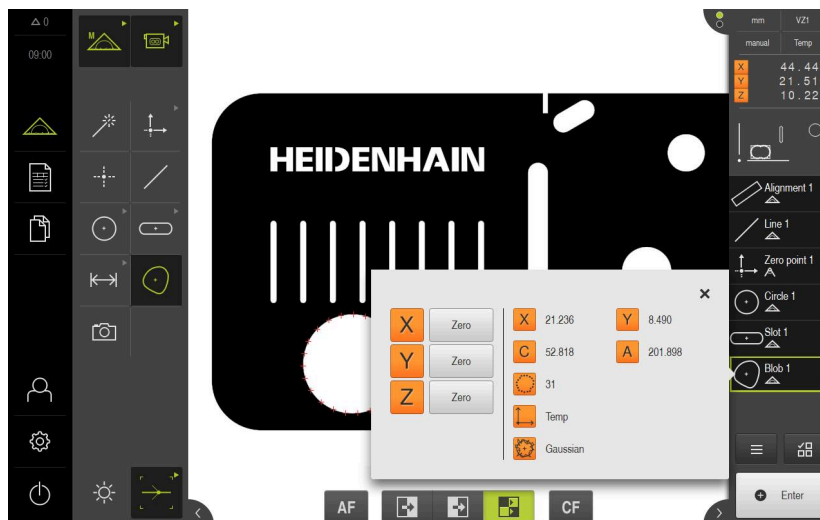


Figure 25: The blob is displayed in the features preview

## 5.2.2 Measuring with an OED sensor

**i** The measurements shown here cannot be simulated with QUADRA-CHEK 3000 Demo, because the corresponding measuring point acquisition is not possible without an encoder and a sensor. However, you can use the descriptions to familiarize yourself with the most important functions and the user interface.

For the measurement of edges and contours with an OED sensor, various measuring tools are available to you for the acquisition of measuring points.

**Further information:** "Overview of the OED measuring tools", Page 55

### Aligning the measured object

Before you can evaluate the measuring points, you need to align the measured object. During this process, the coordinate system of the measured object (workpiece coordinate system) is determined, which is specified in the technical drawing.

This makes it possible to compare the measured values with the data in the technical drawing and assess them.

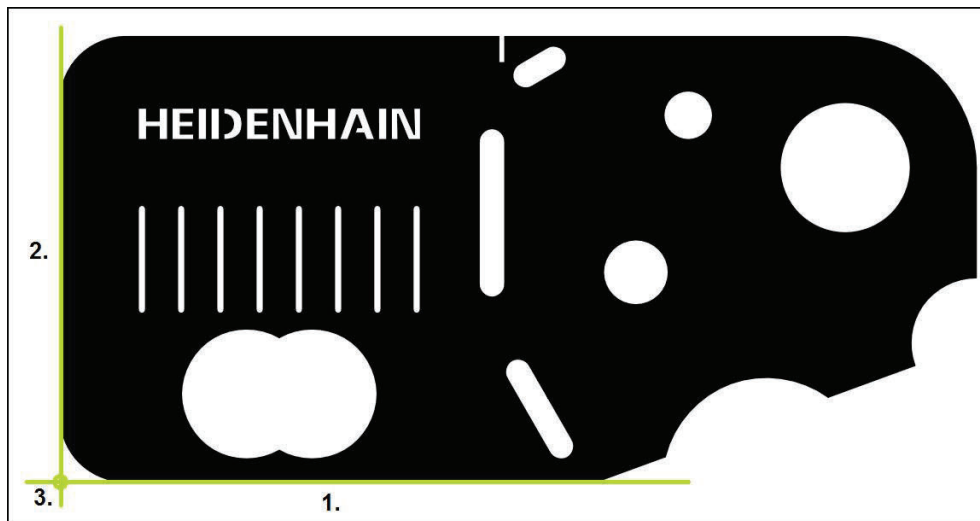


Figure 26: Example of aligning a 2-D demo part

Measured objects are usually aligned in the following steps:

- 1 Measuring the alignment
- 2 Measuring a straight line
- 3 Constructing the zero point

## Measuring the alignment

Define the reference edge for the alignment according to the technical drawing.



- ▶ Tap **Measure** in the main menu



- ▶ Select **Manual measuring** in the function palette



- ▶ If multiple sensors are available, select **OED sensor** in the sensor palette
- ▶ The geometry palette and the OED measuring tools are now displayed
- ▶ The workspace now shows the position display
- ▶ In the quick access menu, select the magnification that is set on the measuring machine
- ▶ If required, select the **XY** projection plane in the quick access menu



- ▶ Select **Alignment** in the geometry palette



- ▶ Select **Auto OED** in the tool palette
- ▶ Cross over the reference edge multiple times with the OED sensor
- ▶ A new feature is displayed in the feature list
- ▶ A new measuring point is added for each pass over the reference edge



Distribute the measuring points along the entire length of the edge. This minimizes the angular error.



- ▶ Tap **Finish** in the new feature
- ▶ The alignment is displayed in the feature list
- ▶ The measurement result preview is now displayed

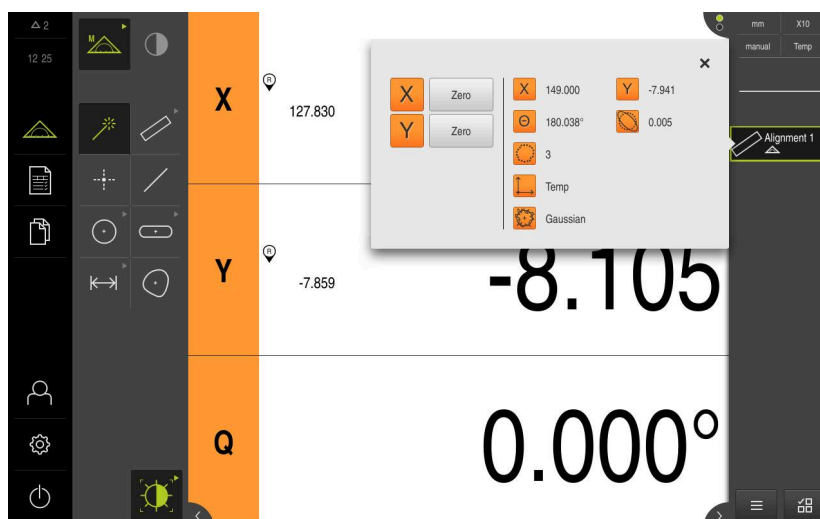


Figure 27: **Alignment** feature in the feature list with **Measurement result preview**

## Measuring a straight line

Measure a straight line as the second reference edge.



- ▶ Select **Line** in the geometry palette



- ▶ Select **Auto OED** in the tool palette
- ▶ Cross over the reference edge multiple times with the OED sensor
- ▶ A new feature is displayed in the feature list
- ▶ A new measuring point is added for each pass over the reference edge



Distribute the measuring points along the entire length of the edge. This minimizes the angular error.



- ▶ Tap **Finish** in the new feature
- ▶ The straight line is displayed in the feature list
- ▶ The measurement result preview appears

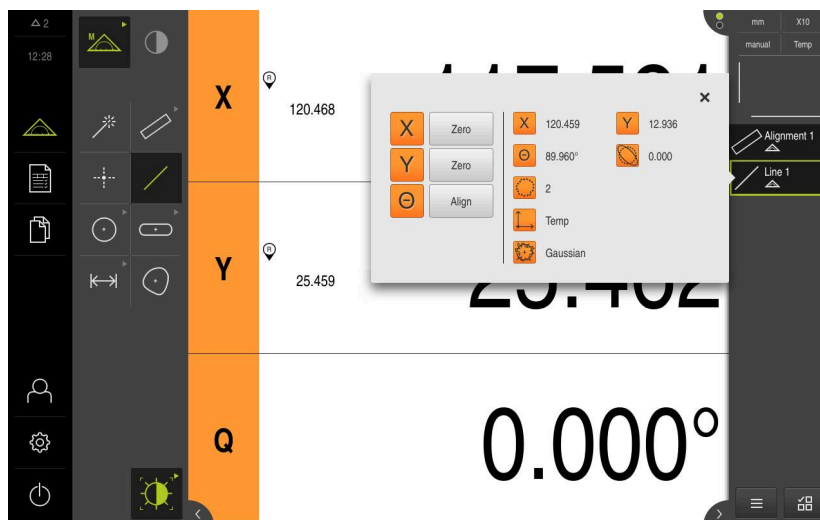


Figure 28: **Line** feature in the feature list with **Measurement result preview**

### Constructing the zero point

Construct the zero point at the point of intersection between the alignment and the straight line.



- ▶ Select **Zero point** in the geometry palette
- ▶ Select the **Alignment** and **Line** features in the Inspector or in the features view

- > The selected features are displayed in green
- > A new feature is displayed in the feature list



- ▶ Tap **Finish** in the new feature
- > The zero point is displayed in the feature list
- > The workpiece coordinate system for the measured object has been determined
- ▶ Tap **Features preview**
- > The coordinate system is shown in the workspace

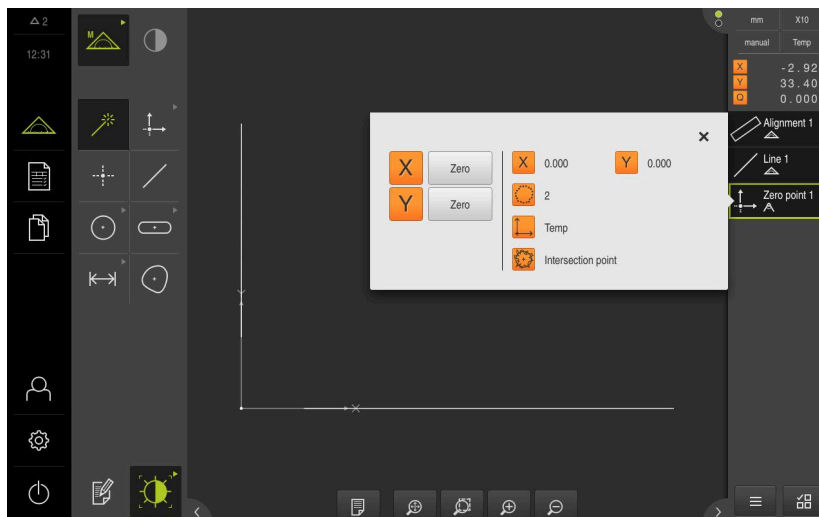


Figure 29: Workspace with zero point displayed in the coordinate system

## Measuring features

To measure features, you can use the geometries of the geometry palette.

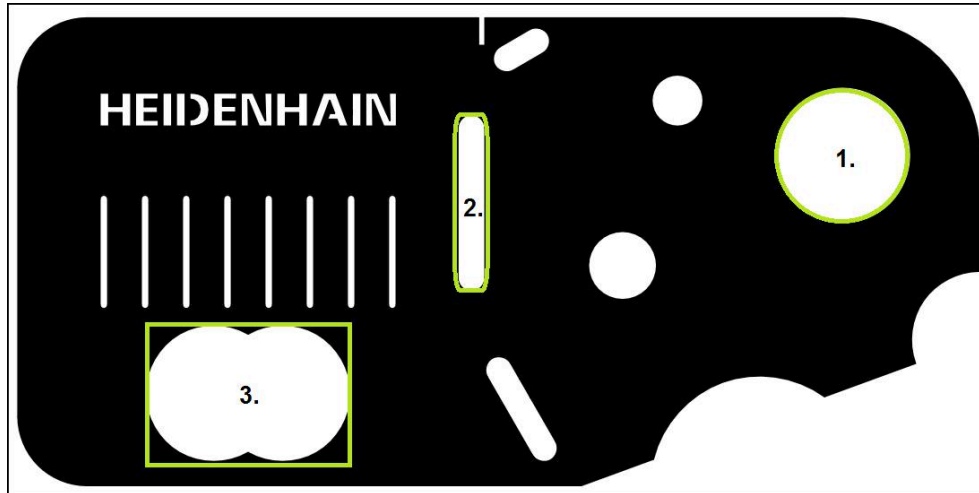


Figure 30: Examples of measuring a 2-D demo part

The section below describes measuring the following features:

- 1 Circle
- 2 Slot
- 3 Blob

### Measuring a circle

A minimum of three measuring points is required to measure a circle. For measuring point acquisition, you can use the **OED** measuring tool, for example.



- ▶ Tap **Measure** in the main menu



- ▶ Select **Manual measuring** in the function palette



- ▶ If multiple sensors are available, select **OED sensor** in the sensor palette
- The geometry palette and the OED measuring tools are displayed
- The workspace now shows the position display
- ▶ In the quick access menu, select the magnification that is set on the measuring machine



- ▶ Select **Measure Magic** in the geometry palette

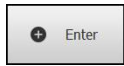
or



- ▶ Select **Circle** in the geometry palette



- ▶ Select **OED** in the tool palette
- ▶ With the OED sensor, traverse the edge of the circle
- The product records the measuring point and saves it to the clipboard



- ▶ To confirm the measuring point acquisition, tap **Enter** in the Inspector
- > A new feature is displayed in the feature list

**i** If the OED sensor traverses an edge, a measuring point is recorded in the clipboard. To add the measuring point to the point cloud of the feature, tap **Enter** in the Inspector.



- ▶ To acquire more measuring points, repeat these steps
- ▶ Tap **Finish** in the new feature
- > The circle is displayed in the feature list
- > The measurement result preview appears

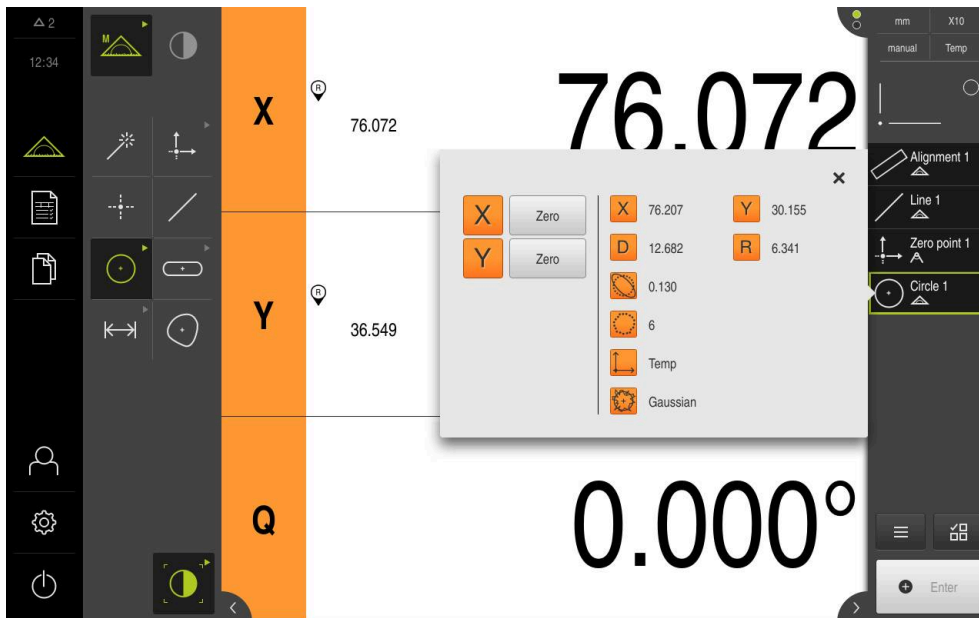


Figure 31: **Circle** feature in the feature list with **Measurement result preview**

## Measuring a slot

A minimum of five measuring points is required in order to measure a slot. To measure point acquisition, you can use the **Auto OED** measuring tool, for example. Place at least two measuring points on the first long side and at least one measuring point on the second long side, and on each arc of the slot.



- ▶ Select **Slot** in the geometry palette



- ▶ Select **Auto OED** in the tool palette
- ▶ Cross over the edge of the slot multiple times with the OED sensor
- > A new feature is displayed in the feature list
- > A new measuring point is added each time the edge is traversed



Distribute the measuring points along the entire length of the first long side, if possible.



- ▶ Tap **Finish** in the new feature
- > The slot is displayed in the feature list
- > The measurement result preview is now displayed

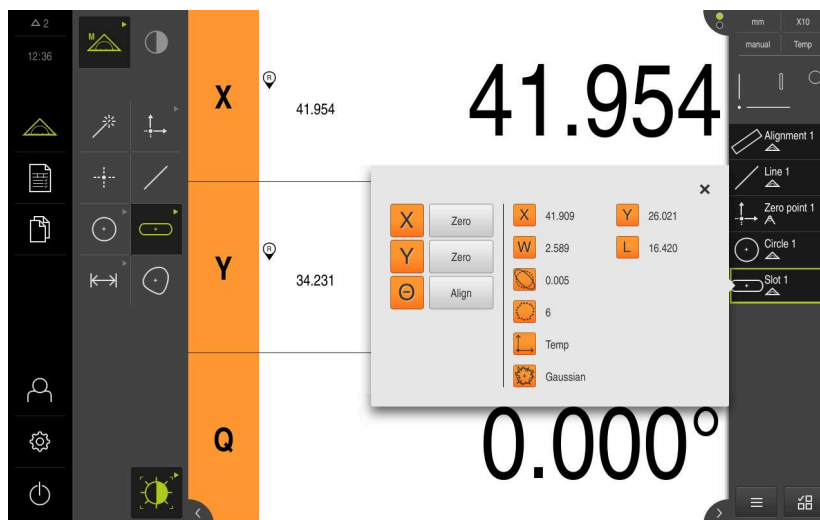


Figure 32: **Slot** feature in the feature list with **Measurement result preview**



## Measuring a blob

A minimum of three measuring points is required to measure a blob. For measuring point acquisition, you can use the **Auto OED** measuring tool, for example. Multiple measuring points are automatically distributed along the entire contour according to the specified settings.



- ▶ Select **Blob** in the geometry palette



- ▶ Select **Auto OED** in the tool palette
- ▶ Cross over the edge of the blob multiple times with the OED sensor
- > A new feature is displayed in the feature list
- > A new measuring point is added each time the edge is traversed



Distribute the measuring points as evenly as possible along the contour of the feature.



- ▶ Tap **Finish** in the new feature
- > The blob is displayed in the feature list
- > The measurement result preview is now displayed

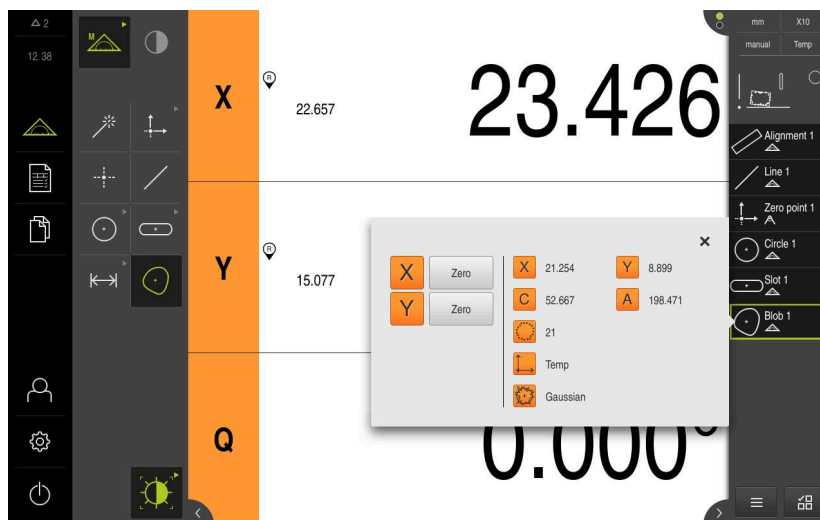


Figure 33: **Blob** feature in the feature list with **Measurement result preview**

### 5.2.3 Measuring with a TP sensor

**i** The measurements shown here cannot be simulated with QUADRA-CHEK 3000 Demo, because the corresponding measuring point acquisition is not possible without an encoder and a sensor. However, you can use the descriptions to familiarize yourself with the most important functions and the user interface.

For measuring edges and contours with a TP sensor, go to the tool palette and select the stylus used on the measuring machine.

**Further information:** "Controls for measuring with a TP sensor", Page 57

#### Aligning the measured object

Measuring points can only be evaluated properly if the measured object has been aligned beforehand. During this process, the coordinate system of the measured object (workpiece coordinate system) is determined. This coordinate system is specified in the technical drawing.

This makes it possible to compare the measured values with the data in the technical drawing and to assess them.

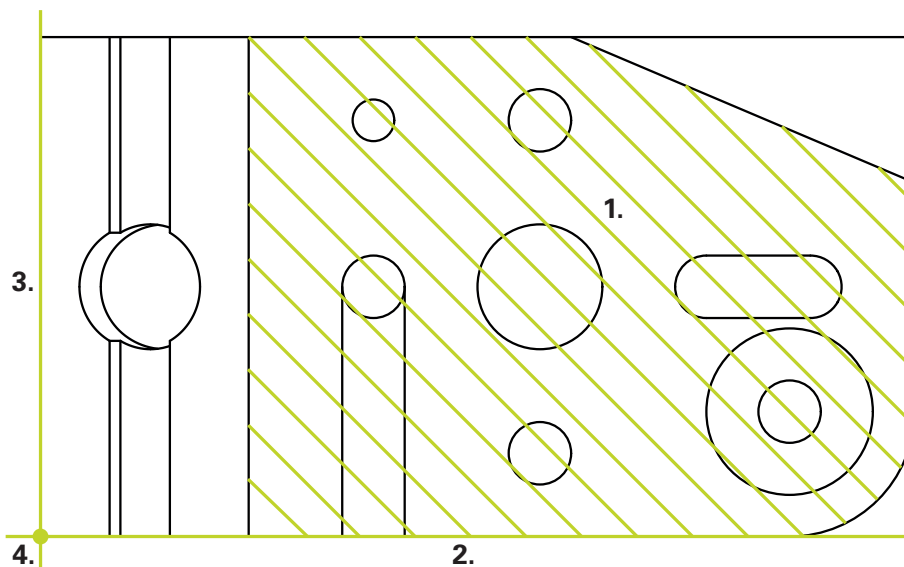


Figure 34: Sample alignment of the 3-D demo part

Measured objects are usually aligned in the following steps:

- 1 Measure **Reference plane**
- 2 Measure **Alignment**
- 3 Measure **Line**
- 4 Construct **Zero point**

## Measuring the Reference plane

Define the reference surface through the **Reference plane** according to the technical drawing. A minimum of three measuring points is required to measure a **Reference plane**.



- ▶ Tap **Measure** in the main menu



- ▶ Select **Manual measuring** in the function palette



- ▶ If multiple sensors are available, select **TP sensor** in the sensor palette
- > The geometry palette and the TP tool palette are displayed
- ▶ If needed, tap **Position preview** in the Inspector
- > The workspace now shows the position display



- ▶ Select **Ref. plane** in the geometry palette



- ▶ In the tool palette, select the stylus used on the measuring machine
- ▶ If you are using a swiveling touch probe head, set its position, if required
- ▶ Move to the first measuring point on the surface
- > If the touch probe is equipped with a triggered probe body, the measuring point will be acquired automatically upon deflection of the stylus
- ▶ If the touch probe is equipped with a rigid (hard) probe body, tap **Enter** in the Inspector
- > A new feature is displayed in the feature list
- ▶ Move to the next measuring points



Distribute the measuring points over the entire surface, if possible. This minimizes position errors.

- ▶ If required, tap **Enter** in the Inspector
- > The measuring point is acquired
- ▶ To acquire more measuring points, repeat these steps
- ▶ To conclude the measuring point acquisition, tap **Finish** in the new feature
- > The **Reference plane** is displayed in the feature list
- > The measurement result preview appears



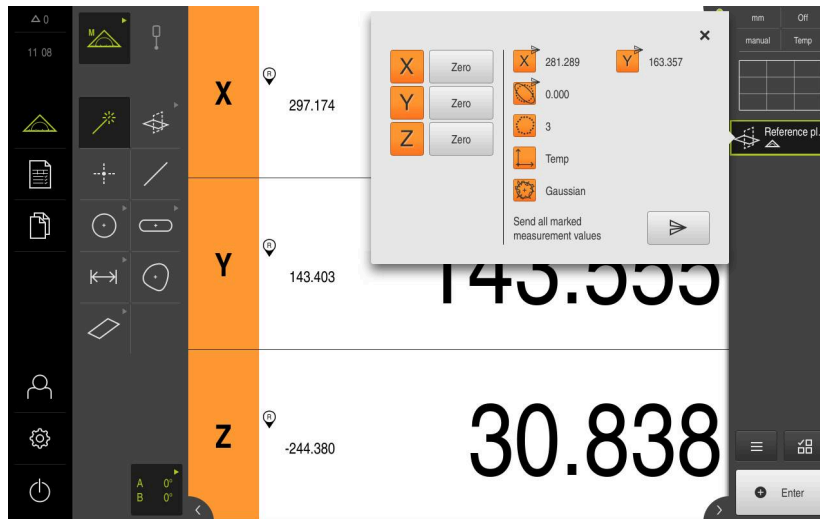


Figure 35: Reference plane feature in the feature list with Measurement result preview

## Measuring the Alignment

Define the reference edge for the **Alignment** according to the technical drawing.

mm	VZ1
manual	World



- ▶ If required, select the **XY** projection plane in the quick access menu
- ▶ Select **Alignment** in the geometry palette
- ▶ Move to the first measuring point on the contour of the alignment
- If the touch probe is equipped with a triggered probe body, the measuring point will be acquired automatically upon deflection of the stylus
- ▶ If the touch probe is equipped with a rigid (hard) probe body, tap **Enter** in the Inspector
- A new feature is displayed in the feature list
- ▶ Move to next measuring point

**i** Distribute the measuring points along the entire length of the edge. This minimizes the angular error.



- ▶ If required, tap **Enter** in the Inspector
- The measuring point is acquired
- ▶ To acquire more measuring points, repeat these steps
- ▶ To conclude the measuring point acquisition, tap **Finish** in the new feature
- The **Alignment** is displayed in the feature list
- The measurement result preview appears

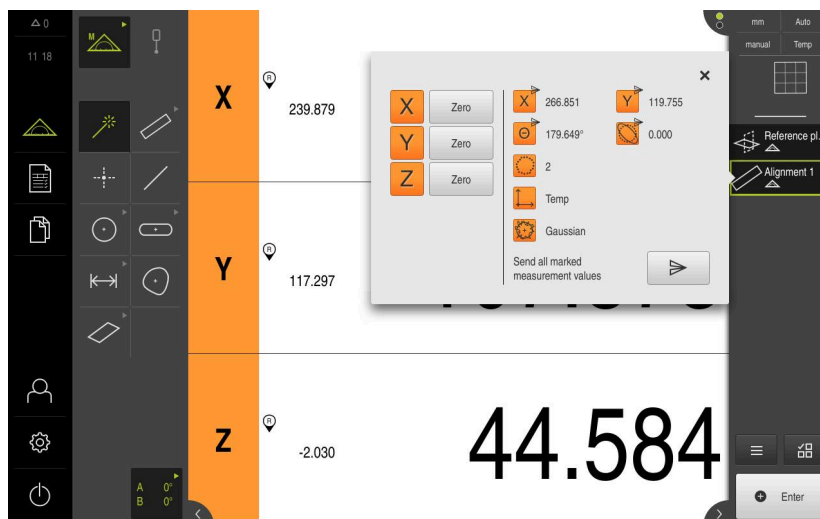


Figure 36: **Alignment** feature in the feature list with **Measurement result preview**

## Measuring the Line

Measure a **Line** as the second reference edge.



- ▶ Select **Line** in the geometry palette
- ▶ Move to the first measuring point on the contour of the straight line
- ▶ If required, tap **Enter** in the Inspector
- ▶ The measuring point is acquired
- ▶ A new feature is displayed in the feature list
- ▶ Move to next measuring point



Distribute the measuring points along the entire length of the edge. This minimizes the angular error.



- ▶ If required, tap **Enter** in the Inspector
- ▶ The measuring point is acquired
- ▶ To acquire more measuring points, repeat these steps
- ▶ To conclude the measuring point acquisition, tap **Finish** in the new feature
- ▶ The **Line** is displayed in the feature list
- ▶ The measurement result preview appears

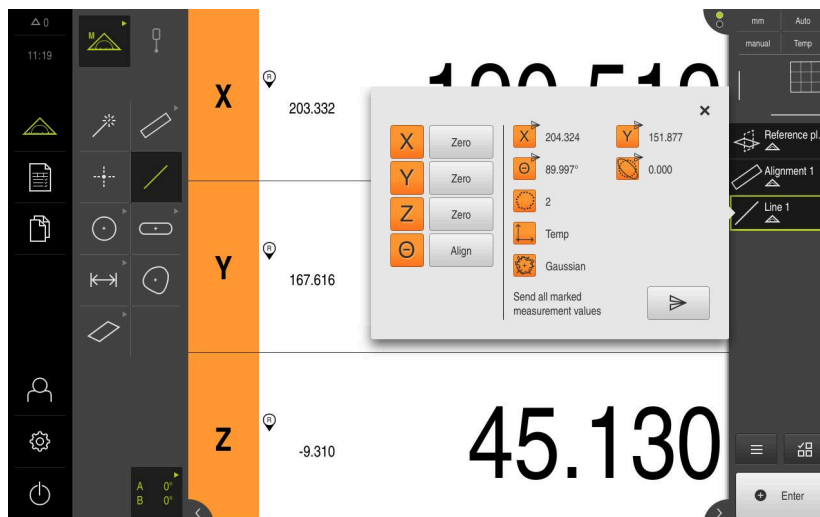


Figure 37: **Line** feature in the feature list with **Measurement result preview**

### Constructing the zero point

First, construct the point of intersection (X and Y axis values) between the straight line and the alignment. Then, construct the zero point from the previously constructed point of intersection and the reference plane.

### Constructing the point of intersection



- ▶ Select **Zero point** in the geometry palette
- ▶ Select the **Orientation** and **Line** features in the Inspector or in the features view
- The selected features are displayed in green
- A new feature is displayed in the feature list



- ▶ Tap **Finish** in the new feature
- The point of intersection is displayed in the feature list
- ▶ Tap **Features preview**
- The point of intersection is now shown in the workspace

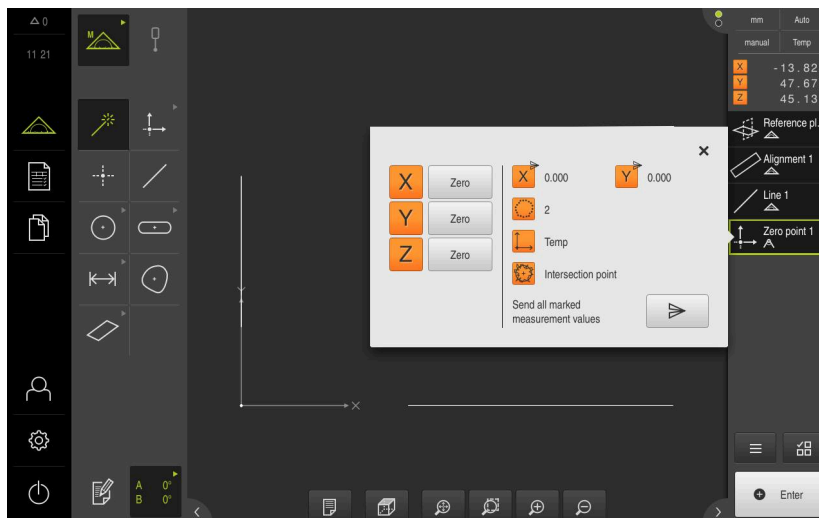


Figure 38: Workspace with point of intersection displayed in the coordinate system

### Constructing the zero point



- ▶ Select **Zero point** in the geometry palette
- ▶ Select the **Reference plane** and **Zero point** features in the Inspector or in the features view
- ▶ The selected features are displayed in green
- ▶ A new feature is displayed in the feature list



- ▶ Tap **Finish** in the new feature
- ▶ The zero point is displayed in the feature list
- ▶ The workpiece coordinate system for the measured object has been determined
- ▶ Tap **Features preview**
- ▶ The coordinate system is shown in the workspace

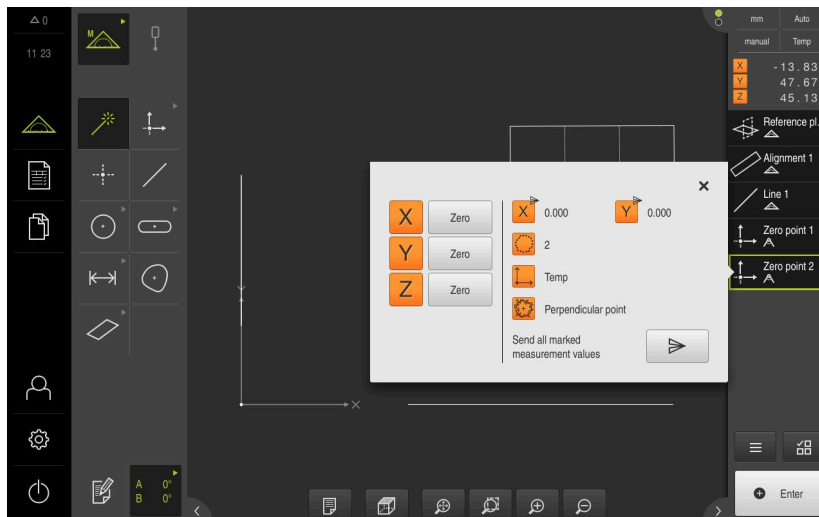


Figure 39: Workspace with zero point displayed in the coordinate system



## Measuring features

To measure features, you can use the geometries of the geometry palette.

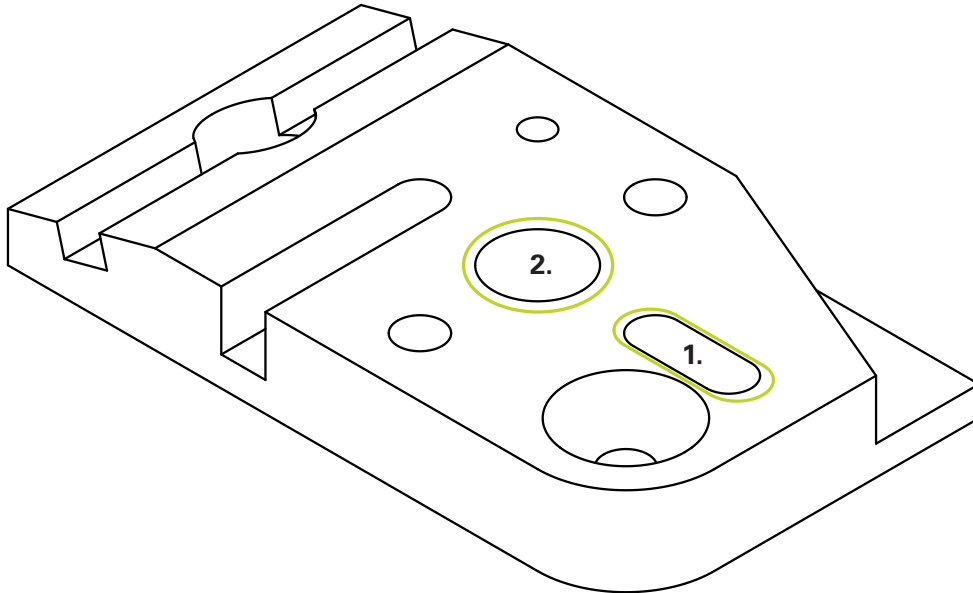


Figure 40: Sample measurements on the 3-D demo part

The section below describes how to measure the following features:

- 1 **Slot**
- 2 **Cylinder**

### Measuring the Slot

A minimum of five measuring points is required to measure a **Slot**. Place at least two measuring points on the first long side and at least one measuring point on the second long side, and on each arc of the slot.



- ▶ Tap **Measure** in the main menu



- ▶ Select **Manual measuring** in the function palette



- ▶ If multiple sensors are available, select **TP sensor** in the sensor palette
- > The geometry palette and the TP tool palette are displayed
- ▶ If needed, tap **Position preview** in the Inspector
- > The workspace now shows the position display



- ▶ Select **Slot** in the geometry palette



- ▶ In the tool palette, select the stylus used on the measuring machine
- ▶ If you are using a swiveling touch probe head, set its position, if required
- ▶ Move to the first measuring point on the contour of the slot
- ▶ If the touch probe is equipped with a triggered probe body, the measuring point will be acquired automatically upon deflection of the stylus
- ▶ If the touch probe is equipped with a rigid (hard) probe body, tap **Enter** in the Inspector
- ▶ A new feature is displayed in the feature list
- ▶ Move to next measuring point
- ▶ If required, tap **Enter** in the Inspector
- ▶ The measuring point is acquired
- ▶ To acquire more measuring points, repeat these steps
- ▶ To conclude the measuring point acquisition, tap **Finish** in the new feature
- ▶ The **Slot** is displayed in the feature list
- ▶ The measurement result preview appears

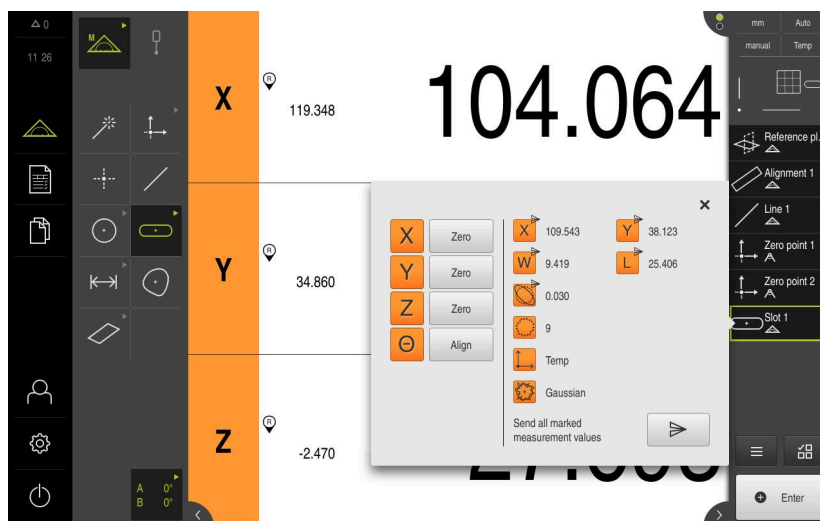


Figure 41: **Slot** feature in the feature list with **Measurement result preview**

## Measuring the Cylinder

At least six measuring points are required to measure a **Cylinder**. Measure a circle near the base surface and another circle near the top surface of the cylinder. Acquire a minimum of three measuring points per circle.



- ▶ Select **Cylinder** in the geometry palette
- ▶ Move to the first measuring point on the contour of the cylinder
- ▶ If required, tap **Enter** in the Inspector
- ▶ The measuring point is acquired
- ▶ A new feature is displayed in the feature list
- ▶ Move to next measuring point



Distribute the measuring points as evenly as possible along the contour of the feature.



- ▶ If required, tap **Enter** in the Inspector
- ▶ The measuring point is acquired
- ▶ To acquire more measuring points, repeat these steps
- ▶ To conclude the measuring point acquisition, tap **Finish** in the new feature
- ▶ The **Cylinder** is displayed in the feature list
- ▶ The measurement result preview appears

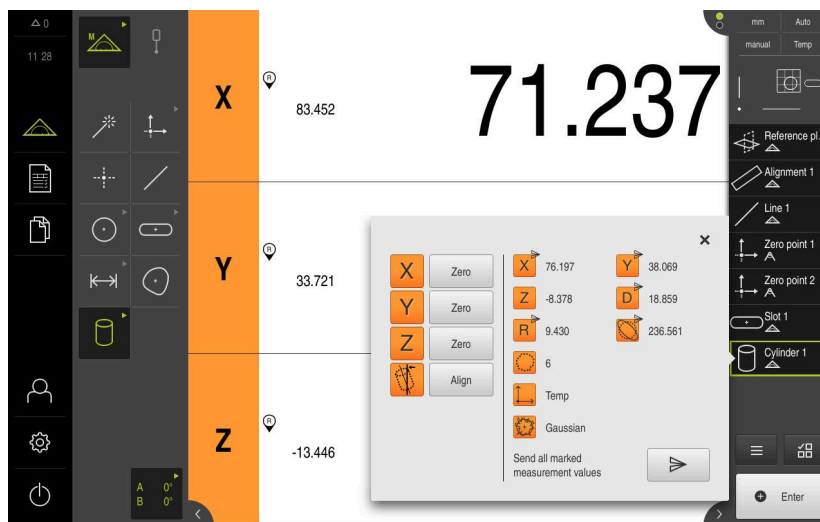


Figure 42: **Cylinder** feature in the feature list with **Measurement result preview**

## 5.2.4 Deleting features

If the measurement fails, one or more features can be deleted from the feature list.



Reference features, such as a zero point, alignment, or reference plane, cannot be deleted as long as other features are referenced to them.



- ▶ Select the desired features from the feature list
- > The selected features are displayed in green
- ▶ Tap **Auxiliary functions** in the Inspector
- ▶ Tap **Delete selection**
- ▶ To delete all features, tap **Delete all**
- ▶ Tap **Close** to close the miscellaneous functions



## 5.3 Displaying and editing the measurement results

Each measured feature can be evaluated and edited in the **Details** dialog.

- ▶ To open the **Details** dialog, drag the corresponding feature from the feature list into the workspace

### Short description

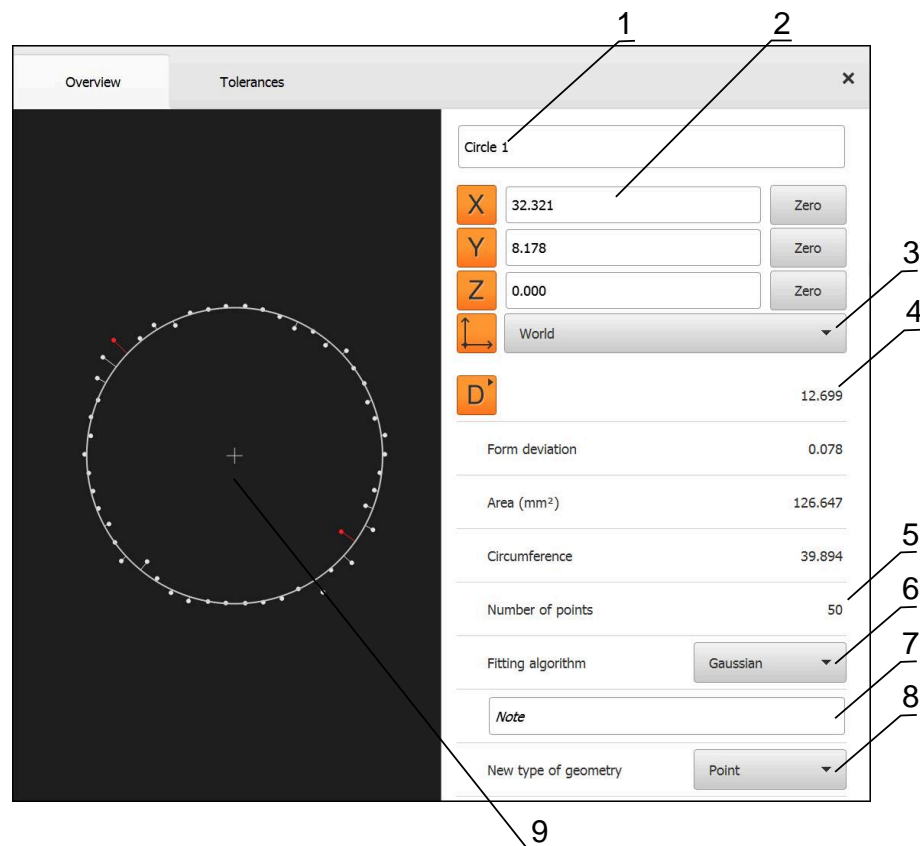


Figure 43: **Overview** tab in the **Details** dialog

- 1 Name of the feature
- 2 Axis positions of the center point
- 3 Coordinate system referenced by the coordinate values of the feature
- 4 Feature parameter, depending on the geometry type: For the circle geometry type, it is possible to toggle between radius and diameter
- 5 Number of measuring points used for calculating the feature
- 6 Fitting algorithm used for calculating the feature; depends on the geometry and the number of measuring points
- 7 2-D plane into which the feature is projected; there is not projection for the "3D" display
- 8 **Note** text field; if annotations are active, its contents will be shown in the features view
- 9 List of geometry types to which the feature can be converted
- 10 View of the measuring points and the shape

### 5.3.1 Renaming a feature

- ▶ Drag the feature from the feature list into the workspace
- > The **Details** dialog box appears with the **Overview** tab selected
- ▶ Tap the input field containing the current name
- ▶ Enter a new name for the feature
- ▶ Confirm entry with **RET**
- > The new name is displayed in the feature list
- ▶ Tap **Close** to close the dialog



### 5.3.2 Selecting the Fitting algorithm

You can adjust the fitting algorithm depending on the measured feature. The Gaussian fitting algorithm is used by default.

- ▶ Drag a feature, e.g. a **Circle**, from the features list into the workspace
- > The **Details** dialog box appears with the **Overview** tab selected
- > The fitting algorithm used is shown in the **Fitting algorithm** drop-down list
- ▶ In the **Fitting algorithm** drop-down list, select the desired fitting algorithm (e.g., **Minimum circumscribed**)
- > The feature is displayed according to the selected fitting algorithm

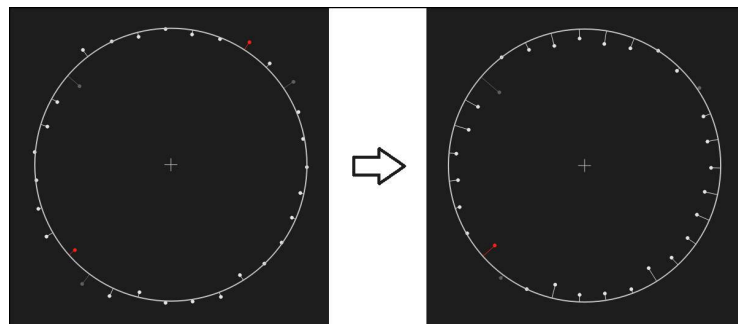


Figure 44: **Circle** feature with new fitting algorithm

- ▶ Tap **Close** to close the dialog



### 5.3.3 Converting a feature

The feature can be converted to a different type of geometry. The list of possible geometry types is provided as a drop-down list in the **Details** dialog.

- ▶ Drag the **Slot** feature from the feature list into the workspace
- > The **Details** dialog box appears with the **Overview** tab selected
- > The geometry type of the feature is displayed
- ▶ In the **New type of geometry** drop-down list, select the **Point** geometry type

**i** The **2-D profile** geometry type is currently not yet supported.

- > The feature is displayed in the new form

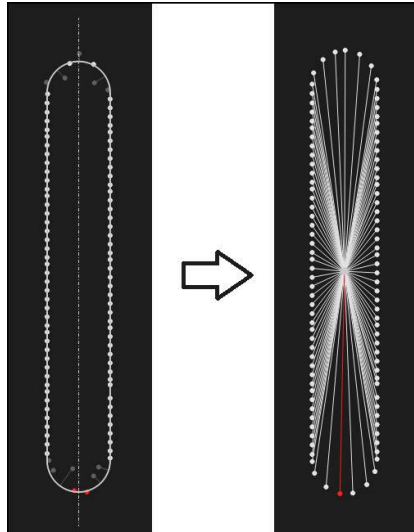


Figure 45: Type of geometry changed from **Slot** to **Point**

- ▶ Tap **Close** to close the dialog



### 5.3.4 Changing Tolerances

On the **Tolerances** tab, you can adjust the tolerances for a measured feature. The tolerances are grouped.



Figure 46: **Details** dialog with **Tolerances** tab

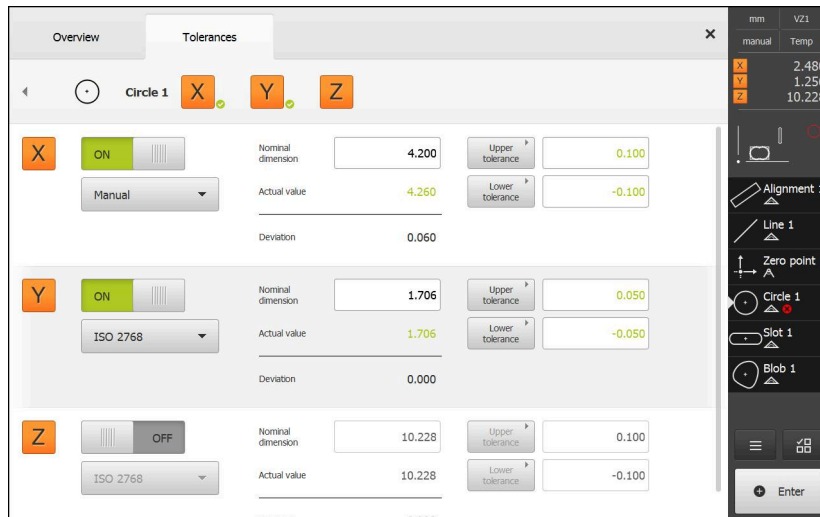
- 1 Display of general tolerance
- 2 List of tolerances, depending on feature
- 3 Status of the tolerance: active and within the tolerance or active and outside the tolerance

In the **Tolerances** tab, you can define the geometrical tolerancing of a feature. The tolerances are grouped.

- ▶ Drag a feature (e.g., a **Circle**) from the feature list into the workspace
- > The **Details** dialog box appears with the **Overview** tab selected
- ▶ Tap the **Tolerances** tab
- > The tab for tolerancing the selected feature is displayed
- ▶ Tap the size tolerance **X**
- > An overview of the selected size tolerance appears





Figure 47: **Size tolerance** overview with activated **X**

- ▶ Activate tolerancing of the measured value with the **ON/OFF** slider

- The selection and input fields become active
- ▶ Tap the **Nominal dimension** input field and enter **76.2**
- ▶ Confirm entry with **RET**
- ▶ Tap the **Upper tolerance** input field and enter **0.1**
- ▶ Confirm entry with **RET**
- ▶ Tap the **Lower tolerance** input field and enter **0.1**
- ▶ Confirm entry with **RET**
- The nominal value is shown in red if it is out of tolerance
- The nominal value is shown in green if it is within tolerance
- ▶ Tap **Back**
- The **Tolerances** tab is displayed
- The results of the tolerance check are shown in the **Tolerances** tab and, after the dialog has been closed, are displayed in the feature list, using the following symbols:



Activated tolerances are maintained



One or more activated tolerances are exceeded

### 5.3.5 Adding annotations

You can add an annotation to every feature in the features view (e.g., measurement information or informational texts).

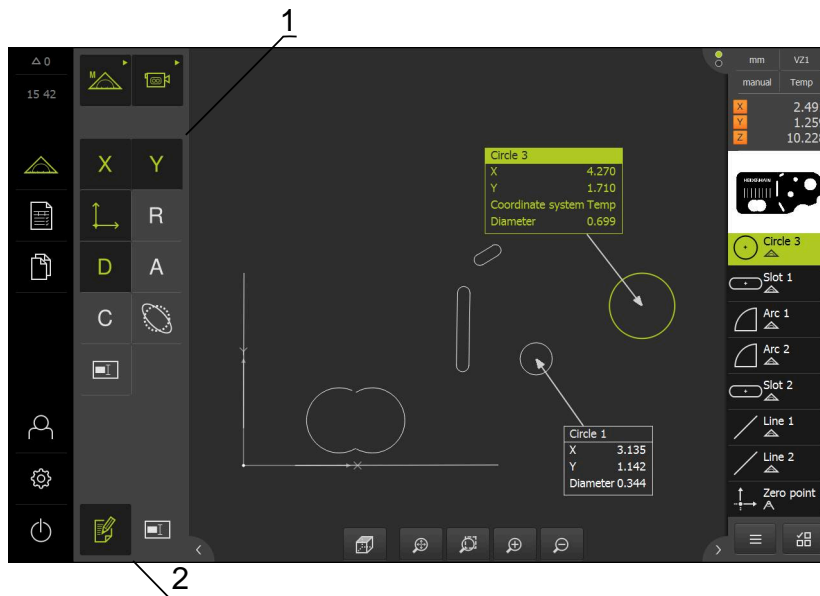


Figure 48: Operating elements for annotations and feature with annotations

- 1 Operating elements for adding annotations to one or more features
- 2 The **Edit annotations** operating element

## 5.4 Creating a measurement report

The following steps are necessary to create a measurement report:

- "Selecting the features and the template"
- "Entering information on the measuring task"
- "Selecting document settings"
- "Saving a measurement report"
- "Exporting or printing a measurement report"

### 5.4.1 Selecting the features and the template



- ▶ Tap **Measurement report** in the main menu
- The list of measured features is displayed, based on the measurement report template that was selected last
- All features in the list are activated and the boxes are displayed in green
- ▶ To change the measurement report template, tap **Templates**
- ▶ Select the desired measurement report template
- ▶ Tap **OK**
- The list of measured features is adapted to the selected measurement report template

#### Filtering features

You can filter the feature list in the **Features** menu by various criteria. This means that only features meeting the filter criteria are displayed, e.g., only circles with a specific minimum diameter. You can use any combination of filters.



The filter function controls how the feature list is displayed. It does not affect the contents of the measurement report.



- ▶ Tap **Filter**



- ▶ Select the desired filter criterion in the dialog
- ▶ Select the operator
- ▶ Select the function



- ▶ Tap **Close** to activate the filter criteria

Filtercriterion	Operator	Function
<b>Type</b>	<b>Is</b>	Only features of the selected geometry type are shown.
	<b>Is not</b>	Only features of geometry types that are not selected are shown.
<b>Size</b>	<b>Equal</b>	Only features of the specified size are shown.
	<b>Greater than</b>	Only features that are larger than the specified size are shown.
	<b>Less than</b>	Only features that are smaller than the specified size are shown.
<b>Tolerance</b>	<b>Is</b>	Only features that fulfill the selected characteristic are shown.
	<b>Is not</b>	Only features that do not fulfill the selected characteristic are shown.
<b>Creation type</b>	<b>Is</b>	Only features that fulfill the selected characteristic are shown.
	<b>Is not</b>	Only features that do not fulfill the selected characteristic are shown.

## 5.4.2 Entering information on the measuring task



The available information depends on the configuration of the template.



- ▶ Tap **Information**
- ▶ In the **Job** input field, enter **Demo1** to identify the measurement job
- ▶ Confirm your input with **RET**
- ▶ Enter the part number **681047-02** of the measured object into the **Part number** input field
- ▶ Confirm your input with **RET**
- ▶ Tap **Close** to close the dialog



## 5.4.3 Selecting document settings



- ▶ Tap **Information**
- ▶ Tap the **Document** tab
- ▶ In the **Date and time format** drop-down list, select the **YYYY-MM-DD hh:mm** (date and time) format
- ▶ Tap **Close** to close the dialog



## 5.4.4 Opening previews

You can display both the features and the measurement report in a preview.

### Opening the features preview



- ▶ Tap the **tab**
- The features preview opens
- The arrow changes direction



- ▶ To close the features preview, tap the **tab**

If you added annotations to your features, they will also be shown in the features preview.

**Further information:** "Adding annotations", Page 106

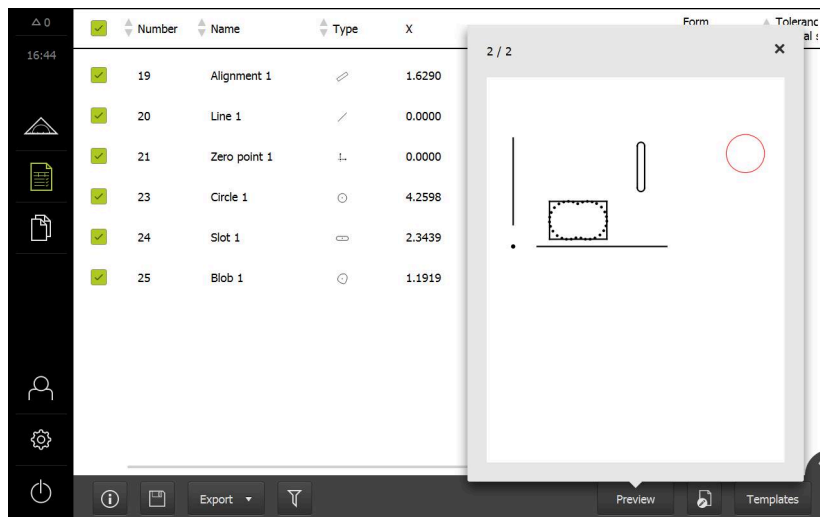


Figure 49: **Measurement report** menu with feature list and features preview

### Opening the measurement report preview

- ▶ Tap **Preview**
- The measurement report preview opens
- ▶ To browse the pages, tap the left or right edge of the preview pane
- ▶ Tap **Close** to close the preview



### 5.4.5 Saving a measurement report

Measurement reports are saved in the XMR data format.



- ▶ Tap **Save as**
- ▶ In the dialog, select the storage location, e.g. **Internal/Reports**
- ▶ Enter a name for the measurement report
- ▶ Confirm your input with **RET**
- ▶ Tap **Save as**
- > The measurement report is saved



The XMR data format has been changed for the current firmware version. You can no longer open or edit files saved in the XMR data format of the previous version.

### 5.4.6 Exporting or printing a measurement report

You can export measurement reports as a PDF file.

#### Exporting the measurement report

- ▶ In the **Export** drop-down list, select the **Export as PDF** export format
- ▶ Select the **Internal/Reports** storage location in the dialog
- ▶ Enter the name **Demo1** for the measurement report
- ▶ Confirm the entry with **RET**
- ▶ Tap **Save as**
- > The measurement report is exported in the selected format and stored in the storage location

### 5.4.7 Opening a measurement report

In the **File management** main menu, you can open the saved report.



- ▶ Tap **File management** in the main menu
- ▶ Select the **Internal/Reports** storage location
- ▶ Select the desired **Demo1.pdf** file
- ▶ A preview image as well as information about the file are displayed

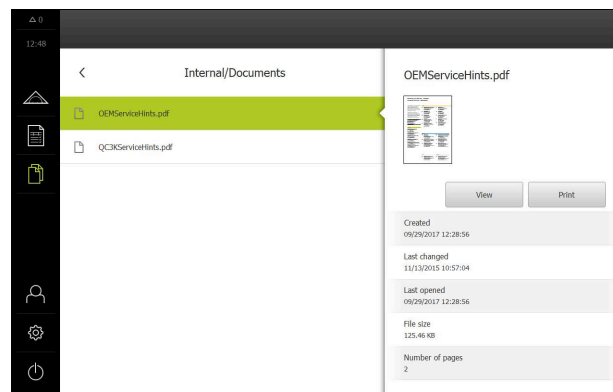


Figure 50: Preview of the measurement report and file information

- ▶ To display the measurement report, tap **View**
- ▶ The file contents are displayed
- ▶ Tap **Close** to close the view







# 6

**ScreenshotClient**

## 6.1 Overview

The standard installation of QUADRA-CHEK 3000 Demo also contains the ScreenshotClient program. With ScreenshotClient, you can take screenshots of the demo software or the unit.

This chapter describes how ScreenshotClient is configured and used.

## 6.2 Information about ScreenshotClient

With ScreenshotClient, you can take screenshots of the active screen of the demo software or the unit from a computer. Before taking a screenshot, select the desired user interface language, as well as the file name and the location where you want to store the screenshots.

ScreenshotClient creates image files of the desired screen:

- In .PNG format
- With the configured name
- With the appropriate language code
- With the time information of year, month, day, hour, minute, and second

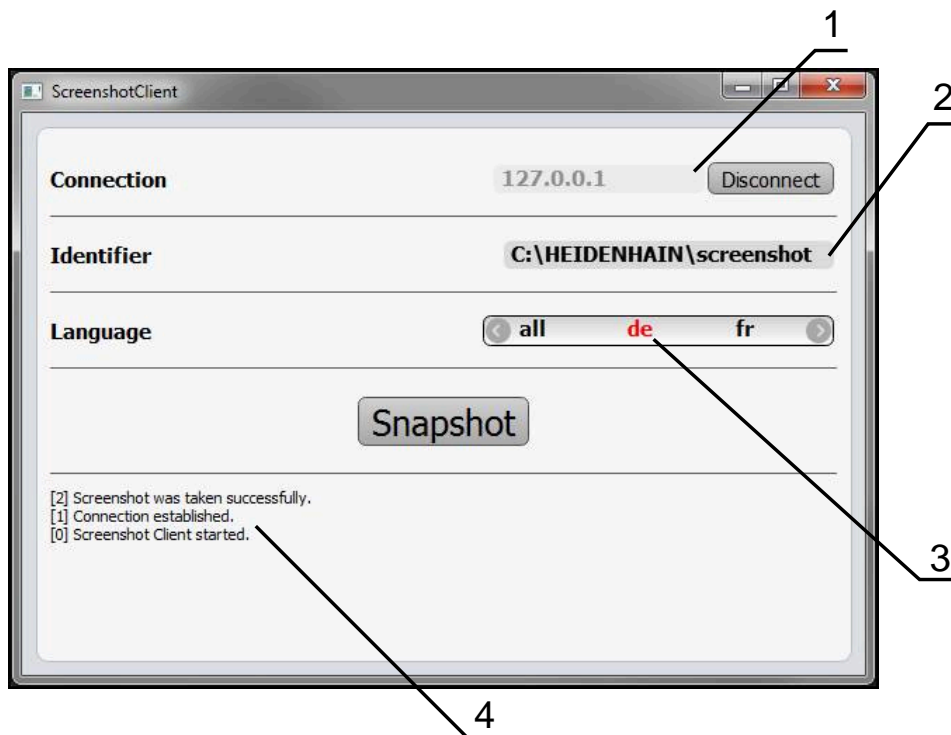


Figure 51: ScreenshotClient user interface

- 1 Connection status
- 2 File path and file name
- 3 Language selection
- 4 Status messages

### 6.3 Starting ScreenshotClient

- ▶ Select in succession in Microsoft Windows:
  - **Start**
  - **All programs**
  - **HEIDENHAIN**
  - **QUADRA-CHEK 3000 Demo**
  - **ScreenshotClient**
- > ScreenshotClient is started:



Figure 52: ScreenshotClient has been started (not connected yet)

- > You can now connect ScreenshotClient with the demo software or the product

### 6.4 Connecting ScreenshotClient with the demo software



Before establishing a connection with ScreenshotClient, first start the demo software or switch on the unit. Otherwise ScreenshotClient will show the status message **Connection close.** when trying to connect.

- ▶ Start the demo software if you have not already done so  
**Further information:** "Starting QUADRA-CHEK 3000 Demo", Page 24
- ▶ Tap **Connect**
- > A connection with the demo software is established
- > The status message is updated
- > The **Identifier** and **Language** input fields become active

## 6.5 Connecting ScreenshotClient with the unit

**Prerequisite:** The network must be configured on the device.



For detailed information on configuring the network at the unit, please refer to the "Setup" chapter in the operating instructions of QUADRA-CHEK 3000.



Before establishing a connection with ScreenshotClient, first start the demo software or switch on the unit. Otherwise ScreenshotClient will show the status message **Connection close.** when trying to connect.

- ▶ Switch on the unit if you have not already done so
- ▶ Enter the **IPv4 address** of the interface in the **Connection** input field.  
You will find the address in the device settings under:  
**Interfaces ▶ Network ▶**
- ▶ Tap **Connect**
- > A connection with the unit is established
- > The status message is updated
- > The **Identifier** and **Language** input fields become active

## 6.6 Configuring ScreenshotClient for taking screenshots

Once you have started ScreenshotClient, you can make the following configurations:

- Location at which screenshots are stored, and what the file names are
- User interface language in which the screenshots are created

### 6.6.1 Configuring the storage location and file name for screenshots

By default, ScreenshotClient saves screenshots to the following storage location:

**C: ▶ HEIDENHAIN ▶ [product designation] ▶ ProductsMGE5 ▶ Metrology ▶ [product code] ▶ sources ▶ [file name]**

You can define a different storage location, if necessary.

- ▶ Tap the **Identifier** input field
- ▶ Enter the path to the storage location and the name for the screenshots into the **Identifier** input field



Use the following syntax to enter the path and file name for screenshots:

**[drive]:\folder\file name]**

- > ScreenshotClient will save all screenshots to the storage location entered

## 6.6.2 Configuring the user interface language of screenshots

The **Language** input field shows all of the user interface languages available for the demo software or the unit. Once you have selected a language code, ScreenshotClient will take screenshots in the corresponding language.



The user interface language you are using in the demo software or on the unit does not have any effect on the screenshots. Screenshots are always created in the language that you have selected in ScreenshotClient.

### Screenshots in the desired user interface language

To take screenshots in a desired user interface language



- ▶ Use the arrow keys to select the desired language code in the **Language** input field



- > The selected language code is shown in red
- > ScreenshotClient creates the screenshots in the desired user interface language

### Screenshots of all available user interface languages

To create screenshots in all available user interface languages



- ▶ Use the arrow keys to select **all** in the **Language** input field
- > The **all** language code is shown in red



- > ScreenshotClient creates the screenshots in all available user interface languages

## 6.7 Creating screenshots

- ▶ In the demo software or on the unit, call the view from which you would like to take a screenshot
- ▶ Switch to **ScreenshotClient**
- ▶ Tap **Snapshot**
- > The screenshot is created and saved to the configured storage location

**i** The screenshot is saved in the format [file name]\_[language code]\_[YYYYMMDDhhmmss] (e.g. **screenshot\_en\_20170125114100**)

- > The status message is updated:

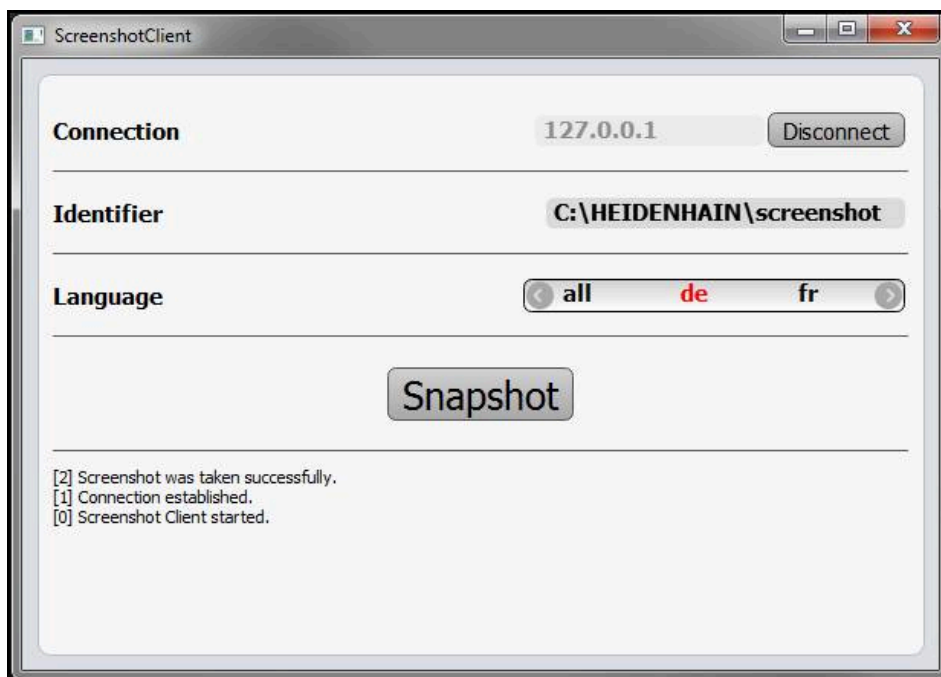


Figure 53: ScreenshotClient after screenshot has been created successfully

## 6.8 Exiting ScreenshotClient

- ▶ Tap **Disconnect**
- > The connection to the demo software or the unit is terminated
- ▶ Tap **Close**
- > ScreenshotClient is exited

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